

NASA

Energy
A Continuing
Bibliography
with Indexes

NASA SP-7043(37)
April 1983

National Aeronautics and
Space Administration



25th Anniversary
1958-1983



(NASA-SP-7043 (37)) ENERGY: A CONTINUING
BIBLIOGRAPHY WITH INDEXES (National
Aeronautics and Space Administration) 296 p
HC A13/MF A01

N83-32178

CSCL 10B

Unclas

00/44

13380

ACCESSION NUMBER RANGES

Accession numbers cited in this Supplement fall within the following ranges.

STAR (N-10000 Series)	N83-10001 - N83-16274
IAA (A-10000 Series)	A83-10001 - A83-19623

ENERGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

Issue 37

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced between January 1 and March 31, 1983 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA).*

This supplement is available as NTISUB/026/093 from the National Technical Information Service (NTIS), Springfield, Virginia 22161 at the price of \$15.00 domestic; \$30.00 foreign.

INTRODUCTION

This issue of *Energy: A Continuing Bibliography with Indexes* (NASA SP-7043(37)) lists 1169 reports, journal articles, and other documents announced between January 1, 1983 and March 31, 1983 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of this continuing bibliography was published in May 1974.

The coverage includes regional, national and international energy systems; research and development on fuels and other sources of energy; energy conversion, transport, transmission, distribution and storage, with special emphasis on use of hydrogen and of solar energy. Also included are methods of locating or using new energy resources. Of special interest is energy for heating, lighting, for powering aircraft, surface vehicles, or other machinery.

Each entry in the bibliography consists of a standard bibliographic citation accompanied in most cases by an abstract. The entries are arranged in eight major categories, with *IAA Entries* preceding *STAR Entries* in each category. The citation, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR* including the original accession numbers from the respective announcement journals. This procedure, which saves time and money accounts for the slight variation in citation appearances.

Six indexes -- subject, personal author, corporate source, contract number, report number, and accession number -- are included.

AVAILABILITY OF CITED PUBLICATIONS

IAA ENTRIES (A83-10000 Series)

All publications abstracted in this Section are available from the Technical Information Service, American Institute of Aeronautics and Astronautics, Inc. (AIAA), as follows: Paper copies of accessions are available at \$8.00 per document. Microfiche⁽¹⁾ of documents announced in *IAA* are available at the rate of \$4.00 per microfiche on demand, and at the rate of \$1.35 per microfiche for standing orders for all *IAA* microfiche.

Minimum air-mail postage to foreign countries is \$2.50 and all foreign orders are shipped on payment of pro-forma invoices.

All inquiries and requests should be addressed to AIAA Technical Information Service. Please refer to the accession number when requesting publications.

STAR ENTRIES (N83-10000 Series)

One or more sources from which a document announced in *STAR* is available to the public is ordinarily given on the last line of the citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

Avail: NTIS. Sold by the National Technical Information Service. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code preceded by the letters HC or MF in the *STAR* citation. Current values for the price codes are given in the tables on page viii.

Documents on microfiche are designated by a pound sign (#) following the accession number. The pound sign is used without regard to the source or quality of the microfiche.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subscription to NASA printed reports, consult the NTIS Subscription Section, Springfield, Va. 22161.

NOTE ON ORDERING DOCUMENTS: When ordering NASA publications (those followed by the * symbol), use the N accession number. NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number. Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line. (NTIS will fill microfiche requests, as stated above, for those documents identified by a # symbol.)

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Administration, Public Document Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

(1) A microfiche is a transparent sheet of film, 105 by 148 mm in size containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 25:1 reduction)

- Avail:** DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in *Energy Research Abstracts*. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center - Its Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.
- Avail:** Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.
- Avail:** USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.
- Avail:** HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.
- Avail:** BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)
- Avail:** Fachinformationszentrum, Karlsruhe. Sold by the Fachinformationszentrum Energie, Physik, Mathematik GMBH, Eggenstein Leopoldshafen, Federal Republic of Germany, at the price shown in deutschmarks (DM).
- Avail:** Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.
- Avail:** U.S. Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of 50 cents each, postage free.
- Other availabilities:** If the publication is available from a source other than the above, the publisher and his address will be displayed entirely on the availability line or in combination with the corporate author line.

GENERAL AVAILABILITY

All publications abstracted in this bibliography are available to the public through the sources as indicated in the category sections. It is suggested that the bibliography user contact his own library or other local libraries prior to ordering any publication inasmuch as many of the documents have been widely distributed by the issuing agencies, especially NASA. A listing of public collections of NASA documents is included on the inside back cover.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics and
Astronautics

Technical Information Service
555 West 57th Street, 12th Floor
New York, New York 10019

British Library Lending Division,
Boston Spa, Wetherby, Yorkshire,
England

Commissioner of Patents and
Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

ESA-Information Retrieval Service
ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

Fachinformationszentrum Energie, Physik,
Mathematik GMBH
7514 Eggenstein Leopoldshafen
Federal Republic of Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information
Facility
P.O. Box 8757
B.W.I. Airport, Maryland 21240

National Aeronautics and Space
Administration
Scientific and Technical Information
Branch (NIT-41)
Washington, D.C. 20546

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey Library
National Center - MS 950
12201 Sunrise Valley Drive
Reston, Virginia 22092

U.S. Geological Survey Library
2255 North Gemini Drive
Flagstaff, Arizona 86001

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

U.S. Geological Survey Library
Box 25046
Denver Federal Center, MS 914
Denver, Colorado 80225

NTIS PRICE SCHEDULES

Schedule A

STANDARD PAPER COPY PRICE SCHEDULE

(Effective January 1, 1983)

Price Code	Page Range	North American Price	Foreign Price
A01	Microfiche	\$ 4 50	\$ 9.00
A02	001-025	7 00	14.00
A03	026-050	8 50	17.00
A04	051-075	10 00	20.00
A05	076-100	11 50	23.00
A06	101-125	13.00	26.00
A07	126-150	14 50	29.00
A08	151-175	16.00	32.00
A09	176-200	17.50	35.00
A10	201-225	19.00	38.00
A11	226-250	20.50	41.00
A12	251-275	22 00	44.00
A13	276-300	23.50	47.00
A14	301-325	25.00	50.00
A15	326-350	26.50	53 00
A16	351-375	28 00	56 00
A17	376-400	29 50	59 00
A18	401-425	31.00	62.00
A19	426-450	32 50	65.00
A20	451-475	34.00	68.00
A21	476-500	35.50	71.00
A22	501-525	37.00	74 00
A23	526-550	38.50	77 00
A24	551-575	40 00	80.00
A25	576-600	41.50	83.00
A99	601-up	-- 1	-- 2

1/ Add \$1.50 for each additional 25 page increment or portion thereof for 601 pages up.

2/ Add \$3.00 for each additional 25 page increment or portion thereof for 601 pages and more.

Schedule E

EXCEPTION PRICE SCHEDULE

Paper Copy & Microfiche

Price Code	North American Price	Foreign Price
E01	\$ 6 50	\$ 13.50
E02	7 50	15.50
E03	9 50	19 50
E04	11.50	23.50
E05	13 50	27 50
E06	15.50	31 50
E07	17.50	35.50
E08	19 50	39.50
E09	21.50	43.50
E10	23 50	47.50
E11	25.50	51.50
E12	28.50	57.50
E13	31.50	63.50
E14	34.50	69.50
E15	37 50	75.50
E16	40.50	81.50
E17	43 50	88.50
E18	46 50	93.50
E19	51 50	102.50
E20	61 50	123.50

E-99 - Write for quote

N01	35.00	45.00
-----	-------	-------

TABLE OF CONTENTS

	Page
Category 01 Energy Policies and Energy Systems Analysis	1
Includes energy requirements, energy conservation, and environmental impacts of energy systems.	
Category 02 Solar Energy	22
Includes solar collectors, solar cells, solar heating and cooling systems, and solar generators.	
Category 03 Hydrogen	74
Includes hydrogen production, storage, and distribution.	
Category 04 Fuels and Other Sources of Energy	77
Includes fossil fuels, nuclear fuels, geothermal, ocean thermal, tidal, and wind energy, and biomass energy production.	
Category 05 Energy Conversion	112
Includes thermomechanical, thermoelectric, geothermal, ocean thermal, and wind energy conversion. Also includes nuclear reactors, magneto-hydrodynamic generators, and fuel cells.	
Category 06 Energy Transport, Transmission, and Distribution	156
Includes transport of fuels by pipelines, tubes, etc., microwave power transmission, and superconducting power transmission.	
Category 07 Energy Storage	159
Includes flywheels, heat storage, underground air storage, compressed air, and storage batteries.	
Category 08 General	169
Subject Index	A-1
Personal Author Index	B-1
Corporate Source Index	C-1
Contract Number Index	D-1
Report / Accession Number Index	E-1
Accession Number Index	F-1

TYPICAL CITATION AND ABSTRACT FROM STAR

NASA SPONSORED DOCUMENT → **AVAILABLE ON MICROFICHE**

ACCESSION NUMBER → **N83-10552 #** Jet Propulsion Lab., California Inst of Tech., Pasadena.

TITLE → **USER HANDBOOK FOR BLOCK IV SILICON SOLAR CELL MODULES** → **CORPORATE SOURCE**

AUTHOR → **M I SMOKLER** 1 Sep. 1982, 63 p refs (Contract NAS7-100) → **PUBLICATION DATE**

CONTRACT OR GRANT → **(NASA-CR-169431; DOE/JPL-1012-75; JPL-PUB-82-73, NAS 1.26 169431)** Avail NTIS HC A04/MF A01 CSCL 10A → **AVAILABILITY SOURCE**

REPORT NUMBER → **The essential electrical and mechanical characteristics of block 4 photovoltaic solar cell modules are described. Such module characteristics as power output, nominal operating voltage, current-voltage characteristics, nominal operating cell temperature, and dimensions are tabulated. The limits of the environmental and other stress tests to which the modules are subjected are briefly described.** M G. → **COSATI CODE**

TYPICAL CITATION AND ABSTRACT FROM /AA

NASA SPONSORED DOCUMENT → **AVAILABLE ON MICROFICHE**

ACCESSION NUMBER → **A83-12508 #** Michigan State Univ. East Lansing

TITLE → **MEASUREMENTS OF ENERGY DISTRIBUTION AND THRUST FOR MICROWAVE PLASMA COUPLING OF ELECTRICAL ENERGY TO HYDROGEN FOR PROPULSION** → **AUTHOR'S AFFILIATION**

AUTHORS → **T MORIN, R CHAPMAN, J FILPUS, M HAWLEY, R KERBER, J ASMUSSEN** (Michigan State University, East Lansing, MI), and S. NAKANISHI (NASA, Lewis Research Center, Cleveland, OH) AIAA, Japan Society for Aeronautical and Space Sciences, and DGLR, International Electric Propulsion Conference, 16th, New Orleans, LA, Nov 17-19, 1982, AIAA 12 p. (AIAA PAPER 82-1951) → **MEETING DATE**

ABSTRACT: A microwave plasma system for transfer of electrical energy to hydrogen flowing through the system has potential application for coupling energy to a flowing gas in the electrothermal propulsion concept. Experimental systems have been designed and built for determination of the energy inputs and outputs and thrust for the microwave coupling of energy to hydrogen. Results for experiments with pressure in the range 100 microns-6 torr, hydrogen flow rate up to 1000 micronmoles/s, and total absorbed power to 700 w are presented. (Author)

A Listing of Energy Bibliographies Contained in This Publication:

- | | |
|--------------------------------------------------------|----------------|
| 1. Heat transfer - A review of 1981 literature | p169 A83-17701 |
| 2. Publications of the Jet Propulsion Laboratory, 1981 | p170 N83-14016 |

APRIL 1983

01

ENERGY POLICIES AND ENERGY SYSTEMS ANALYSIS

Includes energy requirements, energy conservation, and environmental impacts of energy systems.

A83-10069

THE USE OF NEAR COLOR INFRARED PHOTOGRAPHY TO ASSESS THE IMPACT OF THE OIL AND NATURAL GAS INDUSTRY ON LOUISIANA'S WETLANDS

J. A. MONTE (Greenhome and O'Mara, Inc., Riverdale, MD) In: International Geoscience and Remote Sensing Symposium, Washington, DC, June 8-10, 1981, Digest. Volume 2. New York, Institute of Electrical and Electronics Engineers, 1981, p. 768-777. refs

A83-10186*# Mitre Corp., McLean, Va.

ESTIMATION OF AIRCRAFT FUEL CONSUMPTION

B. P. COLLINS (Mitre Corp., McLean, VA) Journal of Aircraft, vol 19, Nov. 1982, p. 969-975. U.S. Department of Transportation refs
(Contract NAS1-16430; DOT-FA79WA-4184, DOT-RS57-80-C-00103)

(Previously cited in issue 14, p. 2299, Accession no. A81-33883)

A83-10439#

ATTEMPT TO DETERMINE THE POWER DEMAND OF A HELICOPTER CONTROL SYSTEM ON THE BASIS OF FLIGHT TESTS [PROBA OKRESLENIA OBCIAZEN UKLADU STEROWANIA SMIGLOWCA W SWIETLE BADAN W LOCIE]

B. CIAS, J. KRECISZ, and J. MORAWSKI Instytut Lotnictwa, Prace, no. 87, 1981, p. 3-18. In Polish. refs

The objective of the present study was to determine the power produced by the control servos of a helicopter under real flight conditions. A statistical analysis of flight test results showed that the nominal power of the servos actually utilized is relatively low. This may be associated with a low value of the servo synchronism coefficient, due probably to the sequential manner in which particular control channels are operated, typical for manual control. B.J.

A83-11156*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

ECONOMIC MODELING OF FAULT TOLERANT FLIGHT CONTROL SYSTEMS IN COMMERCIAL APPLICATIONS

G. B. FINELLI (NASA, Langley Research Center, Hampton, VA) In: NAECON 1982; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 18-20, 1982. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1982, p. 635-642. refs

This paper describes the current development of a comprehensive model which will supply the assessment and analysis capability to investigate the economic viability of Fault Tolerant Flight Control Systems (FTFCS) for commercial aircraft of the 1990's and beyond. An introduction to the unique attributes

of fault tolerance and how they will influence aircraft operations and consequent airline costs and benefits is presented. Specific modeling issues and elements necessary for accurate assessment of all costs affected by ownership and operation of FTFCS are delineated. Trade-off factors are presented, aimed at exposing economically optimal realizations of system implementations, resource allocation, and operating policies. A trade-off example is furnished to graphically display some of the analysis capabilities of the comprehensive simulation model now being developed.

(Author)

A83-11896

WIND POWER FOR THE ELECTRIC-UTILITY INDUSTRY: POLICY INCENTIVES FOR FUEL CONSERVATION

F. MARCH, E. H. DLOTT (Boston, First National Bank, MA), D. H. KORN (Arthur D. Little, Inc., Cambridge, MA), F. R. MADIO (Raytheon Corp., Lexington, MA), R. C. MCARTHUR, and W. A. VACHON (Arthur D. Little, Inc., Cambridge, MA) Research supported by the National Science Foundation Lexington, MA, D. C. Heath and Co., 1982. 170 p. refs
(Contract NSF PRA-80-00488)

\$20

A systematic method for evaluating the economics of solar-electric/conservation technologies as fuel-savings investments for electric utilities in the presence of changing federal incentive policies is presented. The focus is on wind energy conversion systems (WECS) as the solar technology closest to near-term large scale implementation. Commercially available large WECS are described, along with computer models to calculate the economic impact of the inclusion of WECS as 10% of the base-load generating capacity on a grid. A guide to legal structures and relationships which impinge on large-scale WECS utilization is developed, together with a quantitative examination of the installation of 1000 MWe of WECS capacity by a utility in the northeast states. Engineering and financial analyses were performed, with results indicating government policy changes necessary to encourage the entrance of utilities into the field of windpower utilization. M.S.K.

A83-12038

ICE DISTRIBUTION AND WINTER SURFACE CIRCULATION PATTERNS, KACHEMAK BAY, ALASKA

L. W. GATTO (U.S. Army, Cold Regions Research and Engineering Laboratory, Hanover, NH) Remote Sensing of Environment, vol. 12, Nov. 1982, p. 421-435. refs

The development of the hydropower potential of Bradley Lake, Alaska would considerably increase winter freshwater discharge into Kachemak Bay. This could result in increased ice formation and related problems. In order to investigate winter surface circulation in the bay and ice distribution patterns, Landsat MSS bands 5 and 7 and RBV imagery with 70 percent cloud cover or less taken between 1 November and 30 April each year from 1972 to 1980 were examined. The results show that surface water circulation is driven more by tidal forces than by wind stress. The circulation patterns indicate that if additional ice is formed from the increased winter discharge, a greater ice cover would accumulate along Homer Spit and be blown into the outer bay by the dominant northerly winter winds. S.C.S.

01 ENERGY POLICIES AND ENERGY SYSTEMS ANALYSIS

A83-12686

THERMAL INFRARED SENSING APPLIED TO ENERGY CONSERVATION IN BUILDING ENVELOPES /THERMOSENSE IV/; PROCEEDINGS OF THE MEETING, OTTAWA, ONTARIO, CANADA, SEPTEMBER 1-4, 1981

R. A. GROT, (ED.) (National Bureau of Standards, Washington, DC) and J. T. WOOD (Data-Control Systems, Danbury, CT) Meeting sponsored by the SPIE - The International Society for Optical Engineering Bellingham, WA, SPIE - The International Society for Optical Engineering (SPIE Proceedings. Volume 313), 1982. 255 p

\$40

Thermography applications in industrial plants and utility systems are considered. Topics discussed include aerial thermographic data interpretation, aerial infrared survey field evaluations for residential applications, and infrared thermography applications in relation to the Low-Cost Solar Array Program. Also considered are new trends in infrared technology, and training and standards regarding thermography.

R.K.R.

A83-14000

AIRLINE ECONOMICS

G. W. JAMES, (ED.) (Air Transport Association of America, Washington, DC) Lexington, MA, D.C. Heath and Co., 1982 344 p

\$35

This anthology is a compilation of recent ATA studies on airline economics. The background of industry economics is presented, and recent developments in the airline industry and the outlook for the future (e.g., changes in the U.S./international market, 1970-1980, and the impact of the Airline Deregulation Act) Finally, a summary is given of presentations by airline executives to the ATA/Stanford University Symposium on airline planning conducted in the summer of 1980; particular attention is given to marketing planning, financial planning

A83-14517*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

THE SATELLITE POWER SYSTEM - ASSESSMENT OF THE ENVIRONMENTAL IMPACT ON MIDDLE ATMOSPHERE COMPOSITION AND ON CLIMATE

R. C. WHITTEN, W. J. BORUCKI, C. PARK, L. PFISTER, H. T. WOODWARD (NASA, Ames Research Center, Moffett Field, CA), R. P. TURCO (R&D Associates, Marina del Rey, CA), L. A. CAPONE, C. A. RIEGEL (San Jose State University, San Jose, CA), and T. KROPP (Informatics, Inc., Palo Alto, CA) Space Solar Power Review, vol. 3, no 3, 1982, p. 195-221. refs (Contract DE-AL01-79ER-10035)

Numerical models were developed to calculate the total deposition of water vapor, hydrogen, CO₂, CO, SO₂, and NO in the middle atmosphere from operation of heavy lift launch vehicles (HLLV) used to build a satellite solar power system (SPS). The effects of the contaminants were examined for their effects on the upper atmosphere. One- and two-dimensional models were formulated for the photochemistry of the upper atmosphere and for rocket plumes and reentry. An SPS scenario of 400 launches per year for 10 yr was considered. The build-up of the contaminants in the atmosphere was projected to have no significant effects, even at the launch latitude. Neither would there be any dangerous ozone depletion. It was found that H, OH, and HO₂ species would double in the thermosphere. No measurable changes in climate were foreseen.

M.S.K.

A83-16191

MULTIVARIABLE STABILITY-MARGIN OPTIMISATION WITH DECOUPLING AND OUTPUT REGULATION

M. G. SAFONOV (Southern California, University, Los Angeles, CA) and B. S. CHEN (Tatung Institute of Technology, Taipei, Republic of China) IEE Proceedings, Part D - Control Theory and Applications, vol. 129, pt. D, no. 6, Nov. 1982, p. 276-282. refs

(Contract F44620-76-C-0061; AF-AFOSR-80-0013)

A procedure is developed for maximizing frequency-weighted stability-margin singular values for a multivariable linear time-invariant feedback control system subject to design constraints requiring decoupling and asymptotic tracking in the presence of unstable command and disturbance signals and closed-loop stability. The results are derived using Sarason's H-infinity optimal interpolation results, together with a new multivariable realizability lemma

(Author)

A83-16516#

THE APPLICATION OF ENERGY SAVING CONCEPTS TO FUTURE FIGHTER/ATTACK AIRCRAFT DESIGN

S. A. POWERS, H. H. DRIGGERS, and T. E. KRIEG (Vought Corp., Dallas, TX) American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 21st, Reno, NV, Jan. 10-13, 1983, 9 p. refs

(Contract N622691-81-C-0534)

(AIAA PAPER 83-0092)

A study of twenty Energy Saving Concepts as applied to an Advanced Fighter/Attack aircraft intended for an initial operational capability (IOC) of 1995 has been carried out. The results show that the use of Surface Launched Air Targeted Missiles, Advanced Engines, conformal external fuel tanks, variable sweep wings, advanced airfoils, relaxed static margin, and intelligent use of advanced structural materials can significantly reduce the fuel consumption of such an aircraft at a modest increase in Life Cycle Costs.

(Author)

A83-18812#

CASE FOR A SPACE CENTER IN THE ARABIAN GULF

P. GRETTON-WATSON (Scicon Consultancy International, Ltd., London, England) Astronautics and Aeronautics, vol. 21, Jan 1983, p. 47-49.

Because all techniques for transporting natural gas from oil fields such as those of the Arabian Gulf countries, where it is presently being burned off, have serious technical drawbacks, it is suggested that energy-intensive industries be put near those sources of natural gas. The industry identified as being most attractive is a space launch center, located on the Arabian Gulf, that would be devoted to research projects involving large payloads. The hydrogen required by high performance launchers can be produced by methane by means of the stream-reforming process. The hydrogen would be liquefied by conventional techniques, using electricity derived from natural gas-fueled gas turbines. A combination of electricity, pressurized methane and liquefied natural gas would be used for the operation of space center engineering facilities. The low population density of the geographical region in question is noted as an advantage over existing facilities.

O.C.

A83-19150

FUEL SAVINGS IN AIR TRANSPORT

J. L. RENTEUX and H. SCHROEDER Airport Forum, vol. 11, Dec. 1982, p. 36-40.

A summary of conclusions reached in a report by Eurocontrol on civil aircraft fuel conservation measures implementable by ATC is presented. The types of aircraft were categorized together with flight statistics. The average European flight was determined to be 320 nm, with total fuel consumed annually amounting to 16 Mtons. Routing changes were projected to save 4% of the total fuel consumed. Delays, if ameliorated, could account for 1.5% savings, while flight profile changes, if minimized, offer a 3.5-4.5% reduction. In total, from 4.9-5.8% of consumption can be saved in the short term, and an additional 4% in the medium term, i.e., 1985. Various additional steps, including improved training for ATCs,

01 ENERGY POLICIES AND ENERGY SYSTEMS ANALYSIS

links between the flight management computer and the ground-based computers, and start-up and take-off procedures improvements are outlined. D.H.K.

N83-10152# Technical Research Centre of Finland, Espoo Chemical Lab.

A THERMAL DESORPTION COLD-TRAP UNIT FOR GASCHROMATOGRAPHIC ANALYSIS OF GASEOUS ORGANIC POLLUTANTS

V. KARLSSON and F. SCHULTING (Research Inst. for Environmental Hygiene, Delft, Netherlands) 1981 31 p refs (PB82-206368; VTT-15/1981; ISBN-951-38-1284-7; ISSN-0358-5085) Avail: NTIS HC A03/MF A01 CSCL 07D

In atmospheric sampling, a preconcentration step is often necessary to raise the concentration of the pollutants above the sensitivity level of the detecting apparatus. During the work period at ING-TNO, a thermal desorption cold trap (TCT) unit was fitted up. The TCT unit was built for preparation of on solid sorbent material concentrated samples for further analysis. The optimum settings for efficient desorption as well as for cooling and heating of the cold trap were tested. The desorption efficiency of the instrument was at least 95%. No cold spots or dead points were observed where the sample compounds could condensate and remain. The TCT unit did neither cause any peak broadening or separation problems. The developed technique was applied to ambient air and automobile exhaust analysis. Author

N83-10302# Massachusetts Inst. of Tech., Cambridge. **ALTERNATIVE ELECTRIC GENERATION IMPACT SIMULATOR Final Summary Report**

J. GRUHL, D. COATE, and E. SCHWEPPE Aug. 1981 124 p refs Sponsored by Northeast Utilities Service Co. (PB82-180324; MIT-EL-81-044) Avail: NTIS HC A06/MF A01 CSCL 13B

The potential for, and significance of, uncertainty in the energy technology assessment process was explored. Technology assessments primarily from a methodological viewpoint. A general ideal methodology is developed and the potentials for incorporating uncertainties are described. The implementation of an ideal assessment methodology resulted in the coding of a simulator that should be viewed as a framework for assembling and manipulating information about the economics, emissions, ambient concentrations, and potential health impacts of different types and configurations of electric power generating facilities. The framework is probabilistic, and thus results in several measures of the range of various consequences, in other words a graphic display of the quality of the various predictions. The simulator is structured so that it is easy to improve the sophistication of certain manipulations, or to replace generic data, or update or add new data. A.R.H.

N83-10401# National Bureau of Standards, Washington, D.C. **ECONOMIC EFFICIENCY IN THE SIZING OF RESIDENTIAL HEAT PUMPS Final Report**

J. LEVY and S. R. PETERSEN Jul. 1981 75 p refs (PB82-179029; NBSIR-80-2176) Avail: NTIS HC A04/MF A01 CSCL 13A

A methodology to determine the optimal heat pump size, in terms of heating output capacity, for residential installations having annual heating requirements significantly greater than annual cooling requirements is presented. The optimal size heat pump is defined as the size for which total present value, life cycle heating and cooling costs are minimized. Incremental energy savings from increasing the output capacity of the heat pump are calculated using hourly simulation models of heat pump and building performance. The dollar value of the incremental savings, is calculated and compared with incremental costs to determine the optimal heat pump size. A number of sensitivity analyses are performed to show that effects of changes in load size, degradation coefficients, power utilization efficiency, economic assumptions and geographic location on the optimal heat pump size. GRA

N83-10429# Trochoid Power Corp., Eden Prairie, Minn. **POSITIVE DISPLACEMENT ROTARY VAPOR COMPRESSOR FOR VAPOR COMPRESSION Annual Report, Jan. 1981 - Jan. 1982**

R. H. ROCHE and P. B. STIELSTRA Feb. 1982 26 p (Contract GRI-5080-342-0389) (PB82-227620; GRI-80/0134) Avail: NTIS HC A03/MF A01 CSCL 13G

Economic savings are realized by the use of mechanical vapor compression heat pumps to upgrade waste steam to process-useful temperatures. Engineering, design and manufacturing were completed on an advanced positive displacement rotary vapor compressor. Significant features of this proof of concept compressor are its epitrochoidal design, its ability to achieve high compression ratios, high speed valves, and pressurized lubrication and temperature-conditioning systems. A compressor test facility was built incorporating a variable speed drive and a steam supply system capable of subatmospheric inlet pressures. GRA

N83-10481# Bureau of Mines, Pittsburgh, Pa. **COMPUTERIZED, REMOTE MONITORING SYSTEMS FOR UNDERGROUND COAL MINES: FIRES AND EXPLOSIVE ATMOSPHERES**

J. H. WELSH Apr. 1982 15 p refs (PB82-221359; BM-IC-8875) Avail: NTIS HC A02/MF A01 CSCL 08I

The use of computerized, continuous remote monitoring systems for fire and explosive atmosphere safety in underground coal mines was studied. The effects of these systems on the safety level in mines are investigated, and the relationship between mine safety regulations and computerized, continuous, remote monitoring is analyzed. M.G.

N83-10499 International Inst. for Applied Systems Analysis, Laxenburg (Austria).

ENERGY FOR AGRICULTURE IN PAKISTAN

M. JAMEEL May 1982 41 p refs (IIASA-RR-82-20; ISBN-3-7045-0040-2) Avail: Issuing Activity

The energy implications of different farm mechanization and macronutrient supply scenarios were examined. Results show that up to the year 2000, fertilizer production and irrigation-drainage account for 45 % and 40 %, respectively, of total energy input to agriculture. Tractors, threshers, and pesticides share the rest.

Author (ESA)

N83-10506*# Department of Energy, Washington, D. C.

NATIONAL PHOTOVOLTAIC PROGRAM

M. PRINCE In JPL Flat Plate Solar Array Proj.: Proc. of the 20th Proj Integration Meeting p 55-60 Apr. 1982 Avail: NTIS HC A23/MF A01 CSCL 10A

Department of Energy budget plans for 1982 are presented including general funding levels and key program achievements. Activities that are cost-shared with industry are summarized and cell efficiency improvements with time and industry accomplishments are discussed. J.M.S.

N83-10547*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

POTENTIAL BENEFITS FROM A SUCCESSFUL SOLAR THERMAL PROGRAM

K. L. TERASAWA and W. R. GATES In its Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. p 295-318 15 Jul. 1982

Avail: NTIS HC A15/MF A01 CSCL 10A

Solar energy systems were investigated which complement nuclear and coal technologies as a means of reducing the U.S. dependence on imported petroleum. Solar Thermal Energy Systems (STES) represents an important category of solar energy technologies. STES can be utilized in a broad range of applications servicing a variety of economic sectors, and they can be deployed in both near-term and long-term markets. The net present value of the energy cost savings attributable to electric utility and IPH applications of STES were estimated for a variety of future energy

01 ENERGY POLICIES AND ENERGY SYSTEMS ANALYSIS

cost scenarios and levels of R&D success. This analysis indicated that the expected net benefits of developing an STES option are significantly greater than the expected costs of completing the required R&D. In addition, transportable fuels and chemical feedstocks represent a substantial future potential market for STES. Due to the basic nature of this R&D activity, however, it is currently impossible to estimate the value of STES in these markets. Despite this fact, private investment in STES R&D is not anticipated due to the high level of uncertainty characterizing the expected payoffs. B.W.

N83-10550*# Advanco Corp., El Segundo, Calif.

PANEL DISCUSSIONS: INDUSTRIAL SUPPORT SECTOR REQUIREMENTS

B. WASHOM /in JPL Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. p 339-353 15 Jul. 1982
Avail: NTIS HC A15/MF A01 CSCL 10A

Industrial support was the subject of a panel discussion on solar energy technology. Members of various energy-related businesses and agencies were present. Topics covered include: (1) solar collectors; (2) solar energy policy; (3) government/industry relations; and (4) economic factors which influence the use of solar energy. B.W.

N83-10551*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

SOLAR THERMAL TECHNOLOGIES BENEFITS ASSESSMENT: OBJECTIVES, METHODOLOGIES AND RESULTS FOR 1981

W. R. GATES Jul. 1982 45 p refs
(Contract NAS7-100; DE-AM04-80AL-13137; JPL PROJ. 5106-23) (NASA-CR-169373; DOE/JPL-1060-55; JPL-PUB-82-70; NAS 1.26:169373) Avail: NTIS HC A03/MF A01 CSCL 10A

The economic and social benefits of developing cost competitive solar thermal technologies (STT) were assessed. The analysis was restricted to STT in electric applications for 16 high insolation/high energy price states. Three fuel price scenarios and three 1990 STT system costs were considered, reflecting uncertainty over fuel prices and STT cost projections. After considering the numerous benefits of introducing STT into the energy market, three primary benefits were identified and evaluated: (1) direct energy cost savings were estimated to range from zero to \$50 billion; (2) oil imports may be reduced by up to 9 percent, improving national security; and (3) significant environmental benefits can be realized in air basins where electric power plant emissions create substantial air pollution problems. STT research and development was found to be unacceptably risky for private industry in the absence of federal support. The normal risks associated with investments in research and development are accentuated because the OPEC cartel can artificially manipulate oil prices and undercut the growth of alternative energy sources. S.L.

N83-10562*# Computer Sciences Corp., Hampton, Va.

NECAP 4.1: NASA'S ENERGY COST ANALYSIS PROGRAM. THERMAL RESPONSE FACTOR ROUTINE Progress Report, 1981 - 1982

M. R. WEISE Aug. 1982 26 p
(Contract NAS1-16078)
(NASA-CR-165982; NAS 1.26:165982) Avail: NTIS HC A04/MF A01 CSCL 10A

A thermal response factor is described and calculation sequences and flowcharts for RESFAC2 are provided. RESFAC is used by NASA's (NECAP) to calculate hourly heat transfer coefficients (thermal response factors) for each unique delayed surface. NECAP uses these response factors to compute each spaces' hourly heat gain/loss. S.L.

N83-10566*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

NECAP 4.1: NASA'S ENERGY-COST ANALYSIS PROGRAM FAST INPUT MANUAL AND EXAMPLE

R. N. JENSEN and D. L. MINER (Computer Sciences Corp., Hampton, Va.) Aug. 1982 74 p refs
(NASA-TM-83241; NAS 1.15:83241) Avail: NTIS HC A04/MF A01 CSCL 10A

NASA's Energy-Cost Analysis Program (NECAP) is a powerful computerized method to determine and to minimize building energy consumption. The program calculates hourly heat gain or losses taking into account the building thermal resistance and mass, using hourly weather and a response factor method. Internal temperatures are allowed to vary in accordance with thermostat settings and equipment capacity. NECAP 4.1 has a simplified input procedure and numerous other technical improvements. A very short input method is provided. It is limited to a single zone building. The user must still describe the building's outside geometry and select the type of system to be used. Author

N83-10583# Northern Energy Corp., Boston, Mass.

SMALL-SCALE WASTE-TO-ENERGY SYSTEMS: A STATE-OF-THE-ART REPORT

A. L. WHITE /in Argonne National Lab. Proc. of the US Dept. of Energy/Argonne Natl. Lab. Contractors' Res. and Develop. Workshop p 65-71 Feb. 1982 refs
Avail: NTIS HC A16/MF A01

For industry and local government, small scale waste to energy systems represent an increasingly attractive option to enhance energy security, control energy costs, generate revenues and alleviate landfill constraints. Projects are characterized by: a mix of modular and waterwall systems; small and medium size industrial steam customers; a nascent interest in cogeneration; the utilization of a variety of public financing instruments; and growing vendor involvement in facility operations. Experience also points to the pivotal role of one or a few persistent individuals during the project implementation process. Recent operating history is likely to provide the foundation for steady growth in the number of small scale systems during the next decade. Author

N83-10585# Oak Ridge National Lab., Tenn. Chemical Technology Div

ANFLOW: CHARACTERIZATION AND DEVELOPMENT OF AN ENERGY CONSERVING WASTEWATER TREATMENT SYSTEM

R. K. GUNUNG, C. W. HANCHER, and A. L. RIVERA /in Argonne National Lab. Proc. of the US Dept. of Energy/Argonne Natl. Lab. Contractors' Res. and Develop. Workshop p 92-109 Feb. 1982 refs
(Contract W-7405-ENG-26)
Avail: NTIS HC A16/MF A01

An energy conserving wastewater treatment system based on an anaerobic upflow (ANFLOW) bioreactor containing fixed films of microorganisms was developed. The development of a wastewater treatment system which has significant energy conservation and/or energy production advantages as well as lower capital costs when compared to conventional wastewater treatment systems is discussed. E.A.K.

N83-10588# Middlesex County Dept. of Solid Waste Management, New Brunswick, N.J.

INSTITUTIONAL FACTORS IN RESOURCE RECOVERY CO-DISPOSAL DEMONSTRATION PROJECT, MIDDLESEX COUNTY, NEW JERSEY, SPRING 1980 - SUMMER 1981

R. M. MCCARTHY /in Argonne National Lab. Proc. of US Dept. of Energy/Argonne Natl. Lab. Contractors' Res. and Develop. Workshop p 140-156 Feb. 1982 refs
Avail: NTIS HC A03/MF A01

A proposal to provide 1200 tons per day of solid waste disposal combined with 200 tons per day of sludge disposal was presented. The prospects for codisposal in Middlesex County were analyzed. Technically, codisposal was possible, however, it lacked a proven track record. Proposal for a resource recovery plant to be designed,

01 ENERGY POLICIES AND ENERGY SYSTEMS ANALYSIS

built, and operated was acknowledged as consistent with County planning.
E.A.K.

N83-10589# Gilbert/Commonwealth, Reading, Pa.
ENERGY RECOVERY AND COGENERATION FROM AN EXISTING MUNICIPAL INCINERATOR

D. F. CREGO, V. L. ELLER (Central Wayne County Sanitation Authority), and J. W. STEPHENSON (Havens and Emerson, Inc.) /In Argonne National Lab. Proc. of US Dept. of Energy/Argonne Natl. Lab. Contractors' Res. and Develop. Workshop p 163-180 Feb. 1982 refs

Avail: NTIS HC A16/MF A01

An existing 727 TPD incinerator burning mixed municipal refuse was deemed to be a feasible candidate for a cogeneration energy retrofit. It is indicated that equipment and construction of the retrofit will cost \$17.6 million or \$24,200/rated tonne in 1980 dollars; air pollution control equipment will cost 10.4 million or \$14,300/tonne. Furnace temperature and gas samplings along with pilot air pollution control equipment tests were conducted. Refuse was characterized on both wet and dry seasons. Final design is based upon burning 155,000 TPY of refuse from which can be generated, sufficient steam and electricity for inhouse use and an additional amount of 64 million kWh for sale.
E.A.K.

N83-10593# Systech Corp., Xenia, Ohio.
CONVERSION OF MUNICIPAL SOLID WASTE TO ENERGY, JACKSONVILLE, FLORIDA

R. FROUNFELKER and H. BELENCAN /In Argonne National Lab. Proc. of US Dept. of Energy/Argonne Natl. Lab. Contractors' Res. and Develop. Workshop p 226-245 Feb. 1982 refs
Avail: NTIS HC A16/MF A01

A 227 megagram per day prototype auger combustor system is described and performance tests are discussed. The system is a two chamber, starved-air incinerator so named because of the auger located within the primary chamber which tumbles and moves the waste through the system. The feasibility evaluation of resource recovery in the city of Jacksonville, Florida, involved the determination of the following: (1) the amount and characteristics of the solid waste; (2) the location and requirement of candidate energy customers and materials markets; (3) the applicable incineration/heat recovery and resource recovery technologies; and (4) the institutional, legal, and environmental requirements for constructing a facility. The marketing plan developed to define the specific steps required to employ a waste-to-energy technology in the Jacksonville area is also discussed.
M.G.

N83-10600# Oregon Inst. of Tech., Klamath Falls. Geo-Heat Center.
COMMUNITY HEAT-PUMP SYSTEM, KLAMATH COUNTY, OREGON

Mar. 1982 19 p

(Contract DE-FG06-79ET-17156)

(DE82-015106; DOE/ET-17156/T21) Avail: NTIS HC A02/MF A01

The possibility of heating 47 proposed homes on a new development site using ground water source heat pumps is discussed. The pumping temperatures are 780 F for No. 2 Well, neither temperature is hot enough for direct space heating. Temperature profiles of the wells indicate that a temperature hot enough for direct heating (about 1100 F or above) cannot be found at reasonable depth. Since direct geothermal heating is not a practical alternative, the tract will be all-electric since this is the only energy source in the area. The economic feasibility of a community heat pump system that would reduce the amount of electrical energy required to service the homes is addressed.
DOE

N83-10612# Enviro Control, Inc., Rockville, Md.

PROCEEDINGS OF THE CONFERENCE ON ENERGY CONSERVATION: RETROFIT OF MUNICIPAL WASTEWATER TREATMENT FACILITIES

Feb. 1982 270 p refs Conf. held in Los Angeles, 23-25 Jun. 1981

(Contract W-31-109-38-5830)

(DE82-013710; ANL/CNSV/TM-95) Avail: NTIS HC A12/MF A01

The concepts of the roles of heat and temperature, ventilation and water removal when organic material is assembled into a self insulating mass are summarized. The practical application of these concepts in static pile configuration or the Rutgers process are outlined. The concepts and means of application are relevant to all design approaches whether or not a reactor structure is involved, whether the process is batch or continuous, and whether the mass is agitated or static.
DOE

N83-10616# Forschungsstelle fuer Energiewirtschaft, Munich (West Germany).

STUDY OF THE POSSIBILITIES OF MORE RATIONAL USE OF ENERGY IN THE SECTOR OF TRADE AND COMMERCE, PART 1 Final Report, Aug. 1981

K. F. EBERSBACH, A. FISCHER, G. LAYER, W. STEINBERGER, M. WEGNER, and B. WIESNER Bonn Bundesministerium fuer Forschung und Technologie Jun. 1982 146 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-076-PT-1; ISSN-0340-7608) Avail: NTIS HC A07/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 30,50

The energy demand in trade and commerce was analyzed. Measures to improve the energy demand structure are presented. In several typical firms, like hotels, office buildings, locksmith's shops, motor vehicle repair shops, butcher's shops, laundries and bakeries, energy consumption was surveyed and statistically evaluated. Subjects analyzed are: the development of the energy supply; the technology of energy application; the final energy demand broken down into demand for light, power, space heating and process heat as well as the demand for cooling; the daily and annual load curve of energy consumption and its dependence on various parameters; and measures to improve the structure of energy demand. The detailed measurement points out negligences in the surveyed firms and shows some possibilities for likely energy savings. In addition, standard values for specific energy consumption are obtained.
Author (ESA)

N83-10628# Research Inst. of National Defence, Stockholm (Sweden). Systems Analysis Dept.

RUNNING HOT WATER: A SYSTEMS APPROACH TO ENERGY CONSERVATION

P. WULFF Mar. 1982 25 p refs Sponsored by Swedish Energy Research and Development Commission

(FOA-C-10202-M2) Avail: NTIS HC A02/MF A01

Ways to conserve energy in domestic hot water systems are discussed. Examination of the Swedish situation shows that centralized systems, where water heating is a subsidiary of space heating, waste energy because water cools in the pipes after use, and the entire system must operate in summer. Also, water temperature is often much higher than required. Solar panels, individual water heaters, heat pumps, and heat exchangers could contribute to energy conservation, but changes in consumer behavior can also be extremely effective. For example, dish washing energy requirements were reduced by 80% in one neighborhood by giving each apartment a plastic bowl for washing up.
Author (ESA)

01 ENERGY POLICIES AND ENERGY SYSTEMS ANALYSIS

N83-10636# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.

GEOTHERMAL ENERGY DEVELOPMENT IN THE UNITED STATES Final Report, 1976 - 1981

Oct. 1981 144 p refs

(Contract DE-AL01-79ET-27025; EX-76-A-36-1008;

N00024-81-C-5301)

(PB82-215146; JHU/APL/QM-81-130) Avail: NTIS HC A07/MF A01 CSCL 08I

Research on geothermal energy utilization is discussed. Topics include: developing a background in geology, hydrology, and reservoir analysis; establishing the marketability of geothermal energy; collocating users with resources; the transfer of technology; and establishing the beginnings of a geothermal industry infrastructure. Legal, institutional, and economic issues were addressed, as well as information exchange and assistance in state planning through the development of state prospectuses and scenarios. R.J.F.

N83-10642# Greater Egypt Regional Planning and Development Commission, Carbondale, Ill.

IMPACT OF ALTERNATE ENERGY SOURCES IN THE GREATER EGYPT REGION: FRANKLIN, JACKSON, JEFFERSON, PERRY AND WILLIAMSON COUNTIES, ILLINOIS Final Report

Jun. 1981 142 p

(Contract EDA-06-05-11007-10)

(PB82-181090; GERPDC-81-603) Avail: NTIS HC A07/MF A01 CSCL 10A

Economic and environmental aspects of alternate energy sources for the five county Greater Egypt Economic Development District in Southern Illinois are discussed. Various energy sources available, including coal, oil, gas, coal, solar and geothermal are discussed. GRA

N83-10651# Schmidt Reuter Engineering Consulting Co., Cologne (West Germany).

CONSERVING ENERGY BY IMPROVING THE QUALITY OF THE AIR PURIFYING AND AIR CONDITIONING SYSTEMS Final Report, Jun. 1981

U. KNIEL and W. MOOG Bonn Bundesministerium fuer Forschung und Technologie May 1982 436 p refs Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-T-82-067; ISSN-0340-7608) Avail: NTIS HC A19/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 60

After reviewing different air pollution elements and their measurement methods, a definition of 'good air' quality is given, and the necessity of good air filtration is addressed. A filter system, based on the conventional adiabatic diffusion chamber, was developed and a pilot plant was constructed. The activation elements in the pretreatment stage, comprised of an ionizer, a wet surface cooler and a prehumidifier, combine with the separating elements, comprised of packing materials, an electronic collector and a cooling washer. Water analyses show that specified raw water cannot be used as usual in an air washer without purification. If osmotically purified water is used in the washing operation, an increased jet pressure may be used with a positive effect on the particle concentration in the air behind the washer. The filtering element is able to entirely eliminate SO₂, to reduce nitrogen oxides to 15%, carbon oxides and dust particles to such an extent that it is possible to reduce fresh air introduction by 20%.

Author (ESA)

N83-10654# Environmental Protection Agency, Research Triangle Park, N.C. Office of Air, Noise and Radiation.

COMPILATION OF AIR POLLUTANT EMISSION FACTORS, SUPPLEMENT 12

Apr. 1981 192 p refs

(PB82-184722; AP-42-SUPPL-12) Avail: NTIS HC A09/MF A01 CSCL 13B

Revised or updated data are presented for dry cleaning; surface coating; storage of organic liquids; solvent degreasing; graphic arts; consumer/commercial solvent use; sulfuric acid; beer making; ammonium sulfate; primary aluminum; secondary aluminum; gray

iron foundries; steel foundries; secondary zinc; asphaltic concrete; asphalt roofing; NEDS source classification codes and emission factor listing; and table of lead emission factors. Author

N83-10656# Federal Coordinating Council for Science, Engineering and Technology, Washington, D. C.

NATIONAL MARINE POLLUTION PROGRAM PLAN. FEDERAL PLAN FOR OCEAN POLLUTION RESEARCH, DEVELOPMENT AND MONITORING. FISCAL YEARS, 1981 - 1985

Sep. 1981 217 p refs

(PB82-218462; NOAA-82042702) Avail: NTIS HC A10/MF A01 CSCL 13B

This plan represents the second biennial milestone in the continuing interagency planning process called for by the National Ocean Pollution Planning Act of 1978. It summarizes accomplishments that have occurred since the first Federal Plan was published in the fall of 1979, describes priorities of future pollution activities and presents a strategy for improving the National Program. This plan identified opportunities for interagency collaboration and cooperation, and points out research area that are worthy of special attention. Specifically, the plan: describes marine pollution areas that are being addressed by Federal activities; within areas of concern identifies research topics that require additional effort, and those that have been adequately addressed; describes the relative importance of research in each area of concern by discussing existing information gaps, potential severity of the pollution problem, and Federally mandated functions; and presents specific recommendations for improving the program by redirecting existing resources toward the most productive and important areas, improving interagency coordination, or anticipating future problem. GRA

N83-10661# Maryland Academy of Sciences, Baltimore.

ENVIRONMENTAL RESEARCH GUIDING COMMITTEE REPORT Annual Report, 1 Jan. - 31 Dec. 1981

Jan. 1982 53 p

(PB82-220070; PPRP-57) Avail: NTIS HC A04/MF A01 CSCL 13B

Eighteen collections of planted oysters were made from effluent and control stations of two power plant sites in the mid-Atlantic region. A power plant in the middle reaches of a polyhaline salinity regime and a plant in an oligohaline-mesohaline salinity regime on the Potomac River were selected for the study of various aspects of the life history of the oyster and the effects of temperature-salinity interactions in the mid-Atlantic region. Study variables include mortality, shell growth, percent solids and glycogen (condition), timing and level of reproduction and incidence of parasites, commensals and abnormal growths. In addition, comparisons were made with other similar Atlantic and Gulf Coast studies in an attempt to reconcile apparently conflicting data. Input to power plant siting decisions in the Chesapeake Bay area is emphasized. GRA

N83-10663# Environmental Protection Agency, Ann Arbor, Mich. Office of Mobile Source Air Pollution Control.

DETERMINATION OF A RANGE OF CONCERN FOR MOBILE SOURCE EMISSIONS OF HYDROGEN SULFIDE

Jan. 1982 38 p refs

(PB82-201773; EPA-AA-CTAB-PA-82-7) Avail: NTIS HC A03/MF A01 CSCL 13B

Mathematical models that were designed for various exposure scenarios (such as enclosed spaces, expressways, and street canyons) were used to calculate the ambient air concentrations resulting from various mobile source hydrogen sulfide emission factors (grams/mile). A literature search was conducted to aid in the determination of the final range of concern. The results of this analysis provide a range of concern for ambient hydrogen sulfide concentrations of 0.03 mg/cu m to 14.0 mg/cu m. This corresponds to motor vehicle emission levels of from 10.5 to 4,900 mg/mile to 958.5 to 447,300 mg/mile on the road and 0.04 to 204 mg/min to 3.8 to 1,770 mg/min for garages, depending on the type of scenario chosen to represent public exposure. Under nonmalfunction conditions or when the malfunction does not cause

01 ENERGY POLICIES AND ENERGY SYSTEMS ANALYSIS

a rich mixture, high catalyst temperature and low exhaust space velocity, the resulting H₂S emissions are negligible (below the range of concern for any scenario). GRA

N83-10665# National Academy of Sciences - National Research Council, Washington, D. C. Motor Vehicle Nitrogen Oxides Standard Committee.

NO SUB X EMISSION CONTROL FOR HEAVY DUTY VEHICLES: TOWARD MEETING A 1986 STANDARD Final Report

1981 130 p refs

(Contract EPA-68-01-6188)

(PB82-183880; ISBN-0-309-03226-1) Avail: NTIS HC A07/MF A01 CSCL 13B

The technological feasibility of meeting a more stringent standard for nitrogen oxides (NO_x) emissions by 1986 was studied. The impact of emission control technologies on the cost, efficiency, and performance of heavy duty engine vehicles and their impact on other potentially hazardous engine emissions was investigated. The scientific, technical, and cost issues raised by NO_x emission controls for heavy duty vehicles of model year 1986 are analyzed. Several policy questions arising from the technical findings in this study are noted and it is suggested that these questions be considered in a rulemaking procedure. GRA

N83-11136# Rolls-Royce Ltd., Derby (England).

THE FUEL EFFICIENT JET ENGINE

D. J. PARFITT 1982 14 p

(PNR-90114) Avail: NTIS HC A02/MF A01

The development of the RB 211 engine modules is described and the ways in which the RB 211 overcomes problems which reduce fuel efficiency are outlined. Low fuel consumption is achieved by keeping installation losses (intake cowl drag, air and power offtakes) low. High component efficiency, with duct losses and leakages from the core engine minimized is sought. The conflict between the high bypass ratio with low maximum cycle temperature for low jet velocity, and high pressure ratio with high maximum cycle temperature for high thermodynamic cycle efficiency, is resolved by running the engine to the highest temperature consistent with achieving an acceptable high pressure turbine blade life. Author (ESA)

N83-11277# California Univ., Berkeley. Water Thermal and Chemical Technology Center.

ASSESSMENT OF HIGH HEAT-TRANSFER EVAPORATORS AS POWER PLAN CONDENSERS TO PRODUCE ABUNDANT FRESHWATER

A. D. K. LAIRD, J. FRISCH, and E. F. ENSLER 1982 189 p refs

(PB82-198045; OWRT-C-00070-S(0444)(1)) Avail: NTIS HC A09/MF A01 CSCL 07D

Energy requirements to produce abundant freshwater from saline water sources suggests the use of high heat-transfer evaporative condensers in power plants where sufficient waste heat is available for distillation. Review of current existence of such dual-purpose plants as well as a discussion of planning for future designs is presented. Computer programs utilizing available engineering equations and cost analysis for multieffect distillation plants have been developed and are presented with example problems. They are particularly useful for analysis of existing designs, and an additional computer code for optimization of new designs has been developed. The examples show appreciable improvement in lowering unit water cost of the product, as well as adjusting such variables as temperature, mass flow rates and evaporator areas. Preliminary computerized calculations show that a two-effect evaporator unit condensing 7 million pounds per hour of steam from a 1,000 MW power plant would produce 23 million gallons per day of freshwater at a cost of less than \$1 per thousand gallons. Author (GRA)

N83-11591# Forschungsstelle fuer Energiewirtschaft, Munich (West Germany).

STUDY OF THE POSSIBILITIES OF MORE RATIONAL USE OF ENERGY IN THE SECTOR OF TRADE AND COMMERCE, PART 2 Final Report, Aug. 1981

K. F. EBERSBACH, A. FISCHER, G. LAYER, W. STEINBERGER, M. WEGNER, and B. WIESNER Bonn Bundesministerium fuer Forschung und Technologie Jul. 1982 175 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-T-82-077-PT-2; ISSN-0340-7608) Avail: NTIS HC(en1) A08; Fachinformationszentrum, Karlsruhe, West Germany DM 34

The energy demand in the sector of trade and commerce was registered and analyzed. Measures to improve the energy demand structure are presented. In several typical firms like hotels, office buildings, locksmith's shops, motor vehicle repair shops, butcher's shops, laundries and bakeries, detailed surveys of energy consumption were done and included in a statistic evaluation. Subjects analyzed were: development of the energy supply; technology of energy application; final energy demand broken down into demand for light, power, space heating and process heat as well as the demand for cooling; daily and annual load curves of energy consumption and their dependence on various parameters; and measures to improve the structure of energy demand. Detailed measurement points out negligences in the surveyed firms and shows possibilities for likely energy savings. In addition, standard values for specific energy consumption are obtained.

Author (ESA)

N83-11592# Broetje (August) G.m.b.H. und Co., Rastede (West Germany).

DIESEL DRIVEN LOW CAPACITY HEAT PUMP FOR HEATING AND HOT WATER PRODUCTION Final Report, Jun. 1981

P. HOEFLER Bonn Bundesministerium fuer Forschung und Technologie Aug. 1982 96 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-T-82-128; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 20

Heat pumps that reduce primary energy consumption for heating needs when they are driven by an internal combustion motor were studied. The heat produced as well from the heat pump as from the combustion in the diesel motor was used for home heating and hot water preparation. The objective was a 25kW capacity for a one family house. Material used should be standard, so a special design diesel motor or heat pump was not considered. An air/water cooled type diesel motor was coupled to a 12kW capacity heat pump for an outdoor temperature of 3 C using R12 freon as refrigerant. Description of all elements is given. Tests were in the laboratory and in a one family house. The expected efficiency factor of 1.34 could not be confirmed and an average annual value of only 1.05 is assumed. The diesel driven heat pump can not produce the energy savings hoped for. Author (ESA)

N83-11593# Arbeitsgemeinschaft Ruckelshau K.G. (West Germany).

ABSORPTION TYPE WATER CHILLER FIRED DIRECTLY BY WASTE HEAT Final Report, Nov. 1981

K. L. SAUER and K. KALWAR Bonn Bundesministerium fuer Forschung und Technologie Aug. 1982 89 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-T-82-129; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 18

The direct use of waste heat as heating element in a water chiller of the absorption type was studied. The chilled water is used as cooling element in the industrial process, producing the waste heat or for conditioning the workplace or further located places. The heat source is gaseous or liquid. The cooling capacity is in the range from 10 to 120 kW. After reviewing the different absorption systems, LiBr/H₂O proved to be the most suitable. The process retained for experimenting was the manufacturing of

01 ENERGY POLICIES AND ENERGY SYSTEMS ANALYSIS

synthetic materials polymer industry and was tested in two different factories. It is proved that the use of absorption type water chillers is practicable with an efficiency of 10% to 25% of the waste heat energy, but that the existing chillers need extensive conversion for obtaining economical operation when using a low temperature heating source. Author (ESA)

N83-11594# Fraunhofer-Inst. fuer Bauphysik, Holtzkirchen (West Germany)

ECONOMICAL OPTIMIZED THERMAL INSULATION IN BUILDINGS Final Report, May 1981

H. WERNER Bonn Bundesministerium fuer Forschung und Technologie Aug. 1982 232 p refs In GERMAN, ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-T-82-131; ISSN-0340-7608) Avail: NTIS HC A11/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 40

A survey of thermal insulation of buildings, related to economical and physical parameters of fuel oil and insulation methods, was conducted. The different parameters influencing energy consumption in buildings, e.g., heat flux, heat losses by ventilation, internal heat sources, and effect of Sun radiation, were analyzed. A method for determining energy needs was elaborated. The economical and cost depending factors were reviewed and a method of optimizing cost, interest rates, and writing off rate was established. It is stated that energy conservation and economics of building have to be foreseen in the planning phase of construction, that the heat losses by ventilation are a main factor, and that Sun radiation can have a very good influence. Also, the uncertain life of some construction elements makes it difficult to optimize the economic choice. A table reviews the main physical parameters which have a primary importance and the relation to cost of materials and fuel price Author (ESA)

N83-11597# Dortmunder Stadtwerke A.G. (West Germany).

UTILIZATION OF THE WASTE HEAT OF A STEEL WORK Final Report, Jan. 1981

U. KAIER (KA-Planungsgesellschaft mbH) and W. BREYMER (KA-Planungsgesellschaft mbH) Bonn Bundesministerium fuer Forschung und Technologie Aug. 1982 159 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-T-82-135, ISSN-0340-7608) Avail: NTIS HC A08/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 32,50

The use of waste heat of a Siemens-Martin furnace for the production of high pressure steam for a brewery and for a domestic heating network was evaluated. A review of the different possible uses of the high pressure steam, e.g., for heating, for electricity generating, or for cooling, and the actual cost of electricity and fuel and of the domestic heating cost of the already existing network, was made. Cost of the production of steam is calculated, and due to the possible breakdown or maintenance stopping of the Siemens-Martin furnace, cost of the equipment of the boiler with oil or gas burners was evaluated. It is proved that the economical justification for the use of this waste heat doesn't exist. Author (ESA)

N83-11604# Midland-Ross Corp., Toledo, Ohio. Thermal Systems Technical Center.

ADVANCED REGENERATIVE HEAT RECOVERY SYSTEM Annual Report, 1981

A. PRASAD and J. K. JASTI 18 Feb 1982 79 p refs (Contract GRI-5080-342-0394) (PB82-200650; GRI-80/0115; REPT-1253) Avail: NTIS HC A05/MF A01 CSCL 13B

A regenerative heat recovery system was designed and fabricated to deliver 1500 scfm preheated air to a maximum temperature of 1600 F. Since this system is operating at 2000 F, the internal parts were designed to be fabricated with ceramic materials. This system is also designed to be adaptable to an internal metallic structure to operate in the range of 1100 to 1500 F. A test facility was designed and fabricated to test this system.

The test facility is equipped to impose a pressure differential of up to 27 inches of water column in between preheated air and flue gas lines for checking possible leakage through the seals. The preliminary tests conducted on the advanced regenerative heat recovery system indicate the thermal effectiveness in the range of 60% to 70%. Bench scale studies were conducted on various ceramic and gasket materials to identify the proper material to be used in high temperature applications. A market survey was conducted to identify the application areas for this heat recovery system. A cost/benefit analysis showed a payback period of less than one and a half years. Author (GRA)

N83-11606# California State Lands Commission, Sacramento. **GEOTHERMAL RESOURCE DEVELOPMENT FOR DIRECT HEAT APPLICATIONS: THE IMPACT OF REGULATION Final Report**

Mar. 1981 84 p refs (PB82-208414; CAEC-88; P500-81-015) Avail: NTIS HC A05/MF A01 CSCL 08I

The laws of 17 western states are reviewed. Interviews were conducted in four states with regulators, drillers, and users to determine the economic impact of regulation on development and utilization of geothermal energy for direct heat applications. Four recommendations are made to encourage greater direct heat applications while maintaining reasonable regulation of the drilling and utilization of the resource. Author

N83-11609# Science Applications, Inc., La Jolla, Calif.

COGENERATION ENERGY SYSTEMS ASSESSMENT. VOLUME 2: TECHNICAL DISCUSSION Final Report, Apr. 1981 - Jan. 1982

Mar. 1982 252 p refs (Contract GRI-5081-344-0430) (PB82-200692; GRI-81/0013.1; SAI-444-82-074-LJ) Avail: NTIS HC A12/MF A01 CSCL 10B

Gas-fueled cogeneration was assessed to identify research and development opportunities and priorities that maximize the benefits of cogeneration to the gas consumer and utilities. The commercial and multi-family residential market sectors ranging in size from 100 kilowatts (kW) to 10 megawatts (MW) were emphasized. Cogeneration that produced mechanical (shaft horsepower) energy as the primary power was excluded. Technical, economic, and market potential for cogeneration systems in the commercial sector was found to exist. The specific results, conclusions, and impacts cited in this report led to the recommendation to pursue three areas of R&D (in order of priority): (1) Prepackaged, pre-engineered systems; (2) Analyses of--the over-100 kW market and technology, the potential for cogeneration at specific sites in specific utility service territories, cogeneration system reliability, characterization of the light industrial market; (3) Technology development (several specific areas). Author (GRA)

N83-11611# Committee on Merchant Marine and Fisheries (U. S. House).

ACID RAIN: CZMA

Washington GPO 1982 278 p refs Hearings on H.R. 4597 before the Subcomm. on Oceanog. of the Comm. on Merchant Marine and Fisheries, 97th Congr., 1st Sess., 19 Jun., 16 Sep., 29 Oct., and 19 Nov. 1981 (GPO-91-371) Avail: Subcommittee on Oceanography

The effects of acid rain on the environment are discussed. Regulations for its control are debated. The regulation of oil exploration on the continental shelves is discussed. RJF

01 ENERGY POLICIES AND ENERGY SYSTEMS ANALYSIS

N83-11617# Bergbau-Forschung G.m.b.H., Essen (West Germany). Abt. Physikalische Chemie.

LABORATORY RESEARCH FOR DESULFURIZING AND NO-REDUCTION BY ADDITION OF AMMONIA UNDER THE CONDITIONS OF THE BERGBAU-FORSCHUNG FLUE GAS DESULFURIZING PROCESS Final Report, Dec. 1980

E. RICHTER, H. J. SCHMIDT, and J. JUNG Bonn Bundesministerium fuer Forschung und Technologie Aug. 1982 83 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-T-82-147; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 18

Laboratory tests were conducted for improving the catalytic efficiency of charcoal and for improving the thermal regeneration of the activated carbon. The injection of ammonia enhances SO₂ removal. At high SO₂ concentrations, the reduction of NO components is limited. The reduction yield is increased at higher temperatures or in a two stage moving bed reactor, using active coal. In the first bed, mainly sulfur oxides are removed. Upstream from the second bed NH₃ is injected. In this way over 99% of SO₂ and over 80% of NO components can be removed. This was obtained at temperatures ranging from 120 to 150 C. In this process, SO₂ and NO components can be removed both without a modification of the boiler plant and without reheating of the flue gases. Impregnation of the active coal with metal compounds did not increase the catalytic activity. The mechanisms of the reactions, occurring during thermal regeneration of the active charcoal, were found. Author (ESA)

N83-11631# AeroVironment, Inc., Pasadena, Calif.

SOUTHERN CALIFORNIA OFFSHORE AIR QUALITY MODEL VALIDATION STUDY. VOLUME 1: EXECUTIVE SUMMARY Final Report

P. ZANNETTI, D. M. WILBUR, and R. A. BAXTER Nov. 1981 11 p refs 4 Vol.

(Contract DI-AA851-CT0-56)

(PB82-190711; AV-FR-81/559-VOL-1; BLM/YV/SR-81/07-VOL-1) Avail: NTIS HC A02/MF A01 CSCL 13B

Models used to predict onshore air quality impacts from outer continental shelf (OCS) emission sources were validated. Field experiments and computer modeling analysis were used to give a better understanding of dispersion over water and at the land/sea interface. In the field experiments performed, a tracer gas (SF₆) was released from the research vessel RV/Acania, anchored offshore, with tracer gas samples collected downwind at the surface and aloft, both offshore and onshore. Ambient tracer gas concentrations were measured horizontally (across-wind) and vertically at each of the downwind distances. To determine offshore gas concentration, repeated syringe 'grab' samples were taken (for later analysis) from a boat at the surface and a continuous tracer gas analyzer was operated in an airplane aloft. To determine tracer gas concentrations onshore at the surface, hourly-averaged syringe samples and repeated syringe 'grab' samples were taken (for later analysis), while another continuous tracer gas analyzer operated in a mobile van and the airplane made transects aloft.

GRA

N83-11632# AeroVironment, Inc., Pasadena, Calif.

SOUTHERN CALIFORNIA OFFSHORE AIR QUALITY MODEL VALIDATION STUDY. VOLUME 2: SYNTHESIS OF FINDINGS Final Report

P. ZANNETTI, D. M. WILBUR, and R. A. BAXTER Nov. 1981 8 p refs 4 Vol.

(Contract DI-AA851-CT0-56)

(PB82-190729; AV-FR-81/559-VOL-2; BLM/YN/SR-81/08-VOL-2) Avail: NTIS HC A02/MF A01 CSCL 13B

Models commonly used in predicting onshore air quality impacts of OCS emission sources were validated. Field tests and analyses were performed to modify and validate the dispersion aspects of Gaussian and trajectory models. GRA

N83-11633# National Academy of Sciences - National Research Council, Washington, D. C. Polar Research Board.

ARCTIC TERRESTRIAL ENVIRONMENTAL RESEARCH PROGRAMS OF THE OFFICE OF ENERGY RESEARCH, DEPARTMENT OF ENERGY: EVALUATION AND RECOMMENDATIONS. APPENDIX A: TERRESTRIAL ENVIRONMENTAL RESEARCH IN ALASKA DURING 1980-1981

J. R. HAUGH 1981 224 p refs

(Contract DE-AC01-BOEV-1C453)

(PB82-197096) Avail: NTIS HC A10/MF A01 CSCL 13B

A review of ongoing and planned Arctic terrestrial environmental research in Alaska is provided. The goals, philosophies, and directions of research agencies are reviewed. The financial support provided for Arctic terrestrial environmental research is also reviewed. Author (GRA)

N83-11634# National Academy of Sciences - National Research Council, Washington, D. C. Polar Research Board

ARCTIC TERRESTRIAL ENVIRONMENTAL RESEARCH PROGRAMS OF THE OFFICE OF ENERGY RESEARCH, DEPARTMENT OF ENERGY: EVALUATION AND RECOMMENDATIONS

1982 80 p refs

(Contract DE-AC01-BOEV-1C453)

(PB82-197088) Avail: NTIS HC A05/MF A01 CSCL 13B

Possible energy related developments in the Arctic are considered. Environmental research related to these activities and a framework for future research are discussed. Up to 50% of the recoverable oil remaining within U.S. jurisdiction may occur in the Arctic, and coal deposits are perhaps equal to those in the continental U.S. However, almost none of the infrastructures of economically developed areas exist, such as communities, roads, refineries, water and waste facilities, and transportation corridors. Integrated ecological studies centered on at least one intensive research site or landscape unit either in the tundra or the taiga or in an area containing both are among the recommendations. Author (GRA)

N83-11887# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Abteilung Flugverkehrswissenschaft.

THE MODAL SPLIT IN THE JAPANESE PASSENGER TRANSPORTATION SYSTEM

D. EBERLEIN Jan. 1982 52 p refs In GERMAN; ENGLISH summary

(DFVLR-FB-82-09) Avail: NTIS HC A03/MF A01; DFVLR, Cologne DM 16,70

The modal split in the Japanese long-distance passenger transportation system as well as its reasons and impacts are examined. Competition between automobile and train, and between train and airplane, are analyzed. Results show that the competition in Japan is completely different from that in other industrialized countries by reason of the high performance railway network. The secondary impacts are explained with respect to energy consumption and traffic accidents. Transportation demand development in comparison with Germany is described. Author (ESA)

N83-12094*# General Electric Co., Evendale, Ohio. Aircraft Engine Group.

ENERGY EFFICIENT ENGINE. FLIGHT PROPULSION SYSTEM PRELIMINARY ANALYSIS AND DESIGN Report, Jan. 1978 - Nov. 1979

R. P. JOHNSTON Nov. 1979 50 p refs

(Contract NAS3-20643)

(NASA-CR-159859; NAS 1.26:159859; R80AEG396) Avail: NTIS HC A03/MF A01 CSCL 21E

The characteristics of an advanced Flight Propulsion System (FPS) suitable for introduction in the late 1980's to early 1990's, were defined. It was determined that NASA goals for efficiency, environmental considerations, and economics could be met or exceeded with the possible exception of NO_x emission. In evaluating the FPS, all aspects were considered including component design, performance, weight, initial cost, maintenance

01 ENERGY POLICIES AND ENERGY SYSTEMS ANALYSIS

cost, engine-system integration (including nacelle), and aircraft integration considerations. In terms of the NASA goals, the current FPS installed specific fuel consumption was reduced 14.2% from that of the CF6-50C reference engine. When integrated into an advanced, subsonic, study transport, the FPS produced a fuel-burn savings of 15 to 23% and a direct operating cost reduction of 5 to 12% depending on the mission and study-aircraft characteristics relative to the reference engine. J.M.S.

N83-12285# Moreland Associates, Fort Worth, Tex.
EARTH-COVERED BUILDINGS: AN EXPLORATORY ANALYSIS FOR HAZARD AND ENERGY PERFORMANCE Final Report, Sep. 1979 - Nov. 1981

F. L. MORELAND Nov. 1981 314 p
(PB82-189564; MAI-81) Avail. NTIS HC A14/MF A01 CSCL 13M

The performance of earth covered buildings is examined regarding storms, nuclear detonations, earthquakes, fire, nuclear radiation, energy consumption, compatibility with solar energy systems, peak load effects, soil and groundwater effects, air and climate effects, occupant evaluation, and resource management. Potential longterm benefits are assessed, including the areas of economic benefits, community benefits and security benefits.

GRA

N83-12521# Committee on Governmental Affairs (U. S. Senate).

ENERGY CONSERVATION STRATEGY FOR THE 1980'S

Washington GPO 1982 202 p refs Hearing before the Subcomm. on Energy, Nucl. Proliferation and Govt. Process. of the Comm. on Govt. Affairs, 97th Congr., 1st Sess., 21 Jul. 1981 (GPO-86-217) Avail: Subcommittee on Energy, Nuclear Proliferation and Government Processes

The energy conservation strategy is discussed. The level of oil imports is considered. S L.

N83-12536# Technical Univ. of Denmark, Lyngby.

USERS EXPERIENCE IN DENMARK: DEVELOPMENTS, ACHIEVEMENTS AND EXPERIENCE OF THE DANISH ACTIVITIES IN WIND ENERGY UTILIZATION, 1974 - 1981

B. M. PEDERSEN /n Von Karman Inst. for Fluid Dyn. Wind Energy Conversion Devices 11 p 1981
Avail: NTIS HC A17/MF A01

Denmark initiated activities to investigate the possibility of using wind energy as a supplement to the electricity supply. This would eventually alleviate the burden of increasing prices of fossil fuel and also add to the security of supply of energy to the nation. The activities followed two main streams. A governmental R&D programme was formulated and implemented, whereas at the same time private industry embarked on the development of small scale wind energy converting systems (SWECS) for the private user. Two large scale (630 kW) demonstration wind turbines were completed and are now in fully automatic operation. More than 400 SWECS were put into operation, most of them producing electricity for the owners own use but selling surplus power to the utilities. Author

N83-12542# Cook Inlet Region, Inc., San Francisco, Calif.
COAL TO METHANOL FEASIBILITY STUDY: BELUGA METHANOL PROJECT. VOLUME 4: ENVIRONMENTAL Final Report

Sep. 1981 472 p refs Prepared in cooperation with Placer Amex, Inc., San Francisco
(Contract DE-FG01-80RA-50299)
(DE82-006057; DOE/RA-50299-1119-VOL-4) Avail: NTIS HC A20/MF A01

The major environmental issues relevant to development of a coal gasification and methanol fuels production facility and related coal mining activities and transportation systems in the west Cook Inlet area, Alaska were assessed. An extensive review into existing information on the Beluga region of west Cook Inlet was conducted and updated with the findings of land resource projects. Specific field activities then were initiated to expand the environmental

data base in areas relevant to this project where there was a paucity of information. Based on these findings the project was reviewed in detail to identify significant environmental issues and to outline the state and federal permit requirements to ensure that these element are an integral component of all subsequent project planning and management decisions. DOE

N83-12544# Hawaii State Dept. of Planning and Economic Development, Honolulu.

GEOTHERMAL POWER DEVELOPMENT IN HAWAII. VOLUME 1. REVIEW AND ANALYSIS

Jun. 1982 134 p refs 2 Vol.

(Contract DE-FC03-79ET-27133)

(DE82-020077; DOE/ET-27133-T2-VOL-1) Avail: NTIS HC A07/MF A01

The history of geothermal exploration in Hawaii is reviewed briefly. The nature and occurrences of geothermal resources are presented island by island. An overview of geothermal markets is presented. Other topics covered are: potential markets of the identified geothermal areas, well drilling technology, hydrothermal fluid transport, overland and submarine electrical transmission, community aspects of geothermal development, legal and policy issues associated with mineral and land ownership, logistics and infrastructure, legislation and permitting, land use controls, Regulation 8, public utilities commission, political climate and environment, state plans, county plans, geothermal development risks, and business planning guidelines. DOE

N83-12559# Energy Utilization Systems, Inc., Pittsburgh, Pa.

THE 1980 SURVEY AND EVALUATION OF UTILITY CONSERVATION, LOAD MANAGEMENT, AND SOLAR END-USE PROJECTS. VOLUME 3. UTILITY LOAD MANAGEMENT PROJECT Final Report

R. P. BLEVINS Jan. 1982 344 p refs Sponsored in part by ORNL

(Contract W-7405-ENG-26; EPRI PROJ. 1940-1)

(DE82-007247; EPRI-EM-2193-VOL-3) Avail: NTIS HC A15/MF A01

The results of the 1980 survey of electric utility-sponsored energy conservation, load management, and end-use solar energy conversion projects are described. The work is an expansion of a previous survey and evaluation. There are three volumes and a summary document. Each volume presents the results of an extensive survey to determine electric utility involvement in customer-side projects related to the particular technology (i.e., conservation, solar, or load management), selected descriptions of utility projects and results, and first-level technical, and economic evaluations. DOE

N83-12580# One America, Inc., Washington, D.C.

QUESTIONS AND ANSWERS ABOUT ENERGY RECOVERY FROM WASTE

Washington DOE Sep. 1982 29 p refs

(Contract DE-AC01-80CS-24312)

(DE82-022154; DOE/CS-24312/4) Avail: NTIS HC A03/MF A01

Questions and answers about the developing waste-to-energy industry are presented. They are intended as a ready reference for the general public and others interested in exploring the option of utilizing municipal waste as a renewable energy resource. Questions were researched and answered in six broad categories: general information; state-of-the-art; economics/financial; environmental; institutional; and project implementation. DOE

N83-12581# Department of Energy, Washington, D. C. Office of the Secretary.

SECRETARY'S REPORT TO CONGRESS. SECRETARY'S STATEMENT, PROGRAM REVIEW AND OUTLOOK Annual Report

Aug. 1982 176 p

(DE82-021878; DOE/S-0010-82) Avail: NTIS HC A09/MF A01

All elements of the Department of Energy are discussed. Three annexes are included: the Fifth Report to Congress -

01 ENERGY POLICIES AND ENERGY SYSTEMS ANALYSIS

Comprehensive Program and Plan for Federal Energy Education, Extension, and Information Activities (Published December 1981 by the Office of State and Local Programs, Office of Conservation and Renewable Energy, US Department of Energy); Third Annual Report to Congress on the Automotive Technology Development Program (Published February 16, 1982, by the Office of Vehicle and Engine Research and Development, Office of Conservation and Renewable Energy, US Department of Energy); and Observations and Recommendations on the Future of the Energy Extension Service Program; Fourth Report by the National Energy Extension Service Advisory Board (Published January 182 by the Office of State and Local Programs, Office of Conservation and Renewable Energy, US Department of Energy). DOE

N83-12590# Energy and Environmental Analysis, Inc., Arlington, Va.

INDUSTRIAL ENERGY USE, ANNUAL REPORT FOR 1979 - 1980 Final Report

M. O. LERNER, V. S. KOTHARI, A. SARIN, D. C. HAUTH, and C. P. KAPLAN 20 Jan. 1982 121 p refs

(Contract GRI-5014-342-0185)

(PB82-200585; GRI-79/01031) Avail: NTIS HC A06/MF A01 CSCI 10A

Results of a study covering major energy-intensive industries to identify areas with high potentials for improvement in the efficiency of industrial gas use are given. About 85 percent of all natural gas used in industrial process heaters is accounted for in the seven industries which are primary metals (iron and steel, aluminum), stone, clay and glass, petroleum, chemicals, food, textiles, and paper. The study proceeded in four major steps. In step 1, the most recent industrial fuel use data was collected, checked, and disaggregated by process, furnace, and fuel type using five national energy consumption data bases. In Step 2, efficiency and heat distribution for 40 furnaces were determined using energy and material balances. In Step 3, discussions were held with industry representatives to obtain feedback on the study's findings relating to current and future uses of alternate energy sources and promising conservation options which are available or under development. In Step 4, quantitative data on total energy use and typical furnace efficiency were incorporated with qualitative information on future fuel use trends, future changes in process/furnace mix, etc., to identify areas where maximum gains in energy efficiency could occur. GRA

N83-12591# Massachusetts Inst. of Tech., Cambridge. Energy Lab.

A REVIEW OF THE ENERGY PRODUCTIVITY CENTER'S LEAST COST ENERGY STRATEGY STUDY Final Report

D. O. WOOD, M. MANOVE, and E. R. BERNDT Nov. 1981 246 p refs Revised Sponsored by Electric Power Research Inst.

(PB82-188111; MIT/EL-81-043) Avail: NTIS HC A11/MF A01 CSCI 10A

Ways the nation would have provided energy services if its capital stock had been reconfigured to be optimal for actual 1978 energy prices were studied. It is concluded that if the 1978 capital stock had been transformed in conformance with a least-cost principal for providing energy services, per capital energy services would have been reduced by 17%. Author (GRA)

N83-12593# Energy and Environmental Analysis, Inc., Arlington, Va.

INDUSTRIAL ENERGY USE, VOLUME 2 Final Report, Jul. 1979 - Apr. 1981

M. O. LERNER, A. SARIN, and V. S. KOTHARI Jan. 1982 285 p refs Sponsored by Gas Research Inst.

(PB82-200593; GRI-79/0103.2) Avail: NTIS HC A13/MF A01 CSCI 10A

The results of a study covering seven major energy-intensive industries to identify areas with high potential for improvement in the efficiency of industrial gas use are given. The industries studied include primary metals (iron and steel, aluminum); stone, clay, and glass; petroleum; chemicals; food; textiles; and paper. GRA

N83-12594 British Library Lending Div., Boston Spa (England). **POPULATION HAZARDS RESULTING FROM THE COMBUSTION OF FOSSIL FUELS AND THE NUCLEAR POWER INDUSTRY**

Z. JAWOROWSKI 9 Sep. 1982 17 p refs Transl. into ENGLISH from Post. Fiz. Med. (Poland), v. 10, no. 1-2, 1975 p 149-154

(BLL-RISLEY-TR-4173-(9091.9F)) Avail: British Library Lending Div., Boston Spa, Engl.

The building of nuclear power stations into existing power industry systems, is frequently met with negative public opinion as well as administrative opposition resulting from distrust of this new source of energy. The biological damage to the population resulting from nuclear energy sources and those injuries resulting from so called conventional power stations based on fossil fuel are compared. It is suggested that nuclear power stations and the effects of industrial activities associated with them (uranium mines, fuel production and processing plants), impairment of the health of the population living in their vicinity may result primarily from the radionuclides released into the environment near these installations. It is concluded that conventional power stations expose the population to hazards of large quantities of dusts and chemical compounds, the adverse effects of which are incomparably greater than the radiation effects of power stations of both types. E.A.K.

N83-12630# Bedford Inst. of Oceanography, Dartmouth (Nova Scotia). Atlantic Oceanographic Lab.

BACKGROUND LEVELS AND ENVIRONMENTAL CYCLING OF PETROLEUM HYDROCARBONS: MULTIMEDIA MONITORING REQUIREMENTS

E. M. LEVY In WMO On the Develop. of Multimedia Monitoring of Environ Pollution p 325-351 1980 refs

Avail: NTIS MF A01; print copy available at WMO, Geneva

The cycling of petroleum in the environment is discussed and the present state of knowledge concerning the distribution of petroleum pollution in the marine atmosphere, on the surface of the ocean, in the water column, and in marine organisms and sediments is reviewed. Measurements of concentrations of petroleum in the surface microlayer are presented. Tar distributions are highly variable with insufficient sampling preventing generalization. Observations of dissolved or dispersed petroleum residues suggest that there is a background of a few micrograms per liter over much of the Atlantic, Pacific and Indian oceans, with somewhat higher concentrations in the Mediterranean and Baltic seas. Distributions of hydrocarbons in marine organisms are difficult to determine since some organisms produce n-paraffins naturally. Author (ESA)

N83-12659# Massachusetts Inst. of Tech., Cambridge.

SCALE EFFECTS IN LIQUEFIED FUEL VAPOR DISPERSION Final Technical Report

J. A. FAY and D. RANCK Dec. 1981 100 p refs

(Contract DE-AS02-77EV-04204)

(DE82-006198; DOE/EP-0032) Avail: NTIS HC A05/MF A01

Vapor clouds formed by rapid boiling of liquefied gas spilled on land or water exhibit unusual dispersive behavior caused by physical phenomena which are not yet adequately understood. To help elucidate these phenomena this study proposes a method for correlating observations made in disparate field and wind tunnel experiments and, using this methodology, compares all available test data. The bases of the method are a nondimensionalizing of the principle experimental observables and test parameters through use of atmospheric flow parameters and initial cloud properties and the use of a simple entrainment model to simplify the expected relationships among the observed quantities. Peak cloud concentration, travel time and distance are the observables used in this analysis. A good correlation was found in tests of isothermal clouds on level surfaces, but many tests are required to establish average cloud behavior. In tests on sloping ground, cloud drift time and distance were altered but the dilution rate was unaffected. DOE

01 ENERGY POLICIES AND ENERGY SYSTEMS ANALYSIS

N83-12665# Colorado State Univ., Fort Collins. Dept. of Civil Engineering.

THE BEHAVIOR OF LNG VAPOR CLOUDS: WIND-TUNNEL SIMULATION OF 40 M3 LNG SPILL TESTS AT CHINA LAKE NAVAL WEAPONS CENTER, CALIFORNIA Final Report, Jul. 1979 - Jul. 1981

D. E. NEFF and R. N. MERONEY Jul 1981 172 p refs (PB82-199027; CER81-82DEN-RNM1; GRI-80/0094) Avail. NTIS HC A08/MF A01 CSCL 13B

Wind tunnel transient concentration data were obtained from modelling tests which reproduced gaseous dispersion from five different forty cubic meter or less liquefied natural gas (LNG) spills performed at China Lake Naval Weapons Center during the spring and summer of 1980. Comparisons in the transient concentration data between these modeled tests and the field tests indicated which parameters are dominant in the modelling process. Model tests which reproduced the wind shear and turbulence structure of the approach wind reproduced the concentration patterns measured at the field site. This result reinforced the predictive reliability of wind tunnel modeling of larger volume spills. GRA

N83-12666# Colorado State Univ., Fort Collins. Dept. of Civil Engineering.

LNG PLUME INTERACTION WITH SURFACE OBSTACLES Final Report, Sep. 1980 - Sep. 1982

K. M. KOTHARI, R. N. MERONEY, and D. E. NEFF Sep 1981 154 p refs (Contract GRI-5014-352-0203) (PB82-198995; GRI-80/0095; CER81-82KMK-RNM-DEN22) Avail. NTIS HC A08/MF A01 CSCL 13B

A wind-tunnel test program was conducted on a 1:250 scale model to determine the effects of surface obstacles on the dispersion of LNG and neutral density plumes. The tests were conducted with continuous LNG boiloff rate of 30 cu m/min, 4 and 7 m/sec wind speeds and 21 different sets of surface obstacle configurations. Plots of ground-level concentration (mean and peak) contours were constructed. The highest concentrations were observed without any surface obstacles. In general, the lower speed resulted in higher ground-level concentration when the surface obstacle interacted with the plume. The mean concentration measured with neutral density plume was about three to five times smaller in magnitude than those observed with the LNG plume. The measured concentration for LNG plumes tended to have its maximum off the centerline. The addition of smaller buildings gave only slight reduction in the LFL distances. The simulated tree line resulted in approximately the same concentration parallel to the tree line. Author (GRA)

N83-12668# Radian Corp., Durham, N.C.
MECHANISMS OF DRY SO₂ CONTROL PROCESSES Final Report, Sep. 1980 - Sep. 1981

C. APPLE and M. E. KELLY Apr. 1982 137 p refs (Contract EPA-68-02-3171) (PB82-196924; EPA-600/7-82-026) Avail. NTIS HC A07/MF A01 CSCL 13B

Physical and chemical processes and reaction mechanisms for lime spray drying and dry injection of sodium compounds in dry flue gas desulfurization (FGD) processes are discussed. Chemical reactions, physical changes, proposed reaction mechanisms and mathematical models, process parameters affecting reactions and their rate, and data needed to verify proposed reaction mechanisms and models are included. Published technical papers were the primary reference sources. Coal-fired boiler dry FGD applications are emphasized. Lime spray drying reactions are primarily gas/liquid-phase reactions, with SO₂ removal depending on moisture in the lime slurry droplet. Initially, the moisture content is high, and the reaction rate is controlled by diffusion of SO₂ to the droplet surface; most SO₂ removal occurs during this phase. As evaporation reduces the moisture, the dissolution of Ca(OH)₂ into ions limits the SO₂ removal rate. Later, the precipitation of CaSO₃ + 1/2 H₂O onto the surface of the lime particles retards diffusion of SO₂ to the unreacted sorbent. Injecting sodium compound powders into flue gas removes SO₂ via gas/solid

reactions. First, NaHCO₃ is thermally decomposed to Na₂CO₃ (small pores in the sorbent particles increase the particles' surface area and reactivity). Then the SO₂ reacts with Na₂CO₃ to form Na₂SO₃, starting at the particle surface. Author (GRA)

N83-12672# National Academy of Sciences - National Research Council, Washington, D. C. Committee on the Atmosphere and the Biosphere Board on Agriculture and Renewable Resources.

ATMOSPHERE-BIOSPHERE INTERACTIONS: TOWARD A BETTER UNDERSTANDING OF THE ECOLOGICAL CONSEQUENCES OF FOSSIL FUEL COMBUSTION Final Report, 15 Sep. 1978 - 31 Aug. 1981

1981 278 p refs (PB82-182098) Avail. NTIS HC A13/MF A01 CSCL 06F

The pollutants sulfur and nitrogen compounds, trace metals, and organic substances were examined. It was noted that understanding of patterns of emission, transport, deposition, and biological effects of these pollutants is incomplete. Atmospheric transport and deposition processes and biological accumulation are described. A guide was developed to predict consequences of continued or accelerated pollution, and effects of acid rain were reported. It is concluded that increased scientific effort is needed in two critical areas: long term monitoring and forecasting of future effects of these pollutants, and ecotoxicology. GRA

N83-13217# American Gas Association Labs., Cleveland, Ohio.
COMMERCIALIZATION OF A PULSE COMBUSTION FURNACE WITH ULTRAHIGH EFFICIENCY Final Annual Report, Jan. - Dec. 1980

F. E. BELLES and J. C. GRIFFITHS Chicago GRI Feb. 1982 79 p (Contract GRI-5014-341-0112) (PB82-243809; GRI-80/0131) Avail. NTIS HC A05/MF A01 CSCL 13M

The development of pulse combustion technology, with specific application to furnaces with ultrahigh efficiency is discussed. A nationwide field test of 10 prototype pulse combustion furnaces was conducted which indicated savings ranging from 13 to 46 percent over conventional furnaces alternately operated with the pulse furnaces at the sites for comparison purposes. GRA

N83-13270# Office of Technology Assessment, Washington, D.C.

INCREASED AUTOMOBILE FUEL EFFICIENCY AND SYNTHETIC FUELS. ALTERNATIVES FOR REDUCING OIL IMPORTS Summary Report

Sep. 1982 39 p refs (OTA-E-186) Avail. NTIS HC A03/MF A01; HC also available from SOD

Increased automobile fuel efficiency and synthetic fuels production with respect to their potential to reduce conventional oil consumption, and their costs and impacts are assessed. Conservation and fuel switching as a means of reducing stationary oil uses are also considered. S.L.

N83-13402# Carrier Corp., Syracuse, N.Y.

NORTHERN-CLIMATE HEAT-PUMP FIELD PERFORMANCE EVALUATION Final Report

W. R. READY and C. E. BULLOCK Jul. 1982 86 p refs Sponsored by Electric Power Research Inst. (Contract EPRI PROJ. 789-1) (DE82-905832; EPRI-EM-2319) Avail. NTIS HC A05/MF A01

The field data and related analysis for four residential and one commercial heat pump installation are presented. Results that cover both heating and cooling operation are presented for an initial period of one year. Additional results reflecting changes in heat pump equipment and controls are presented for selected sites. The building structures, the associated heat pumps, and the instrumentation system used to record the performance data are described. DOE

01 ENERGY POLICIES AND ENERGY SYSTEMS ANALYSIS

N83-13465# Argonne National Lab., Ill.
VEHICLE CHARACTERIZATION FOR THE TAPCUT PROJECT: PERFORMANCE AND COST
 C. L. HUDSON, E. S. PUTNAM, and M. J. BERNARD Nov. 1981 143 p refs
 (Contract W-31-109-ENG-38)
 (DE82-019772; ANX/EES-TM-171) Avail: NTIS HC A07/MF A01

Three sets of technologies for urban transportation for use in testing energy conservation strategies were developed. Each set included both personal and mass transportation vehicles; different socioeconomic conditions were assumed for each of the three sets. Vehicles in the first set combine the best performance and fuel economy characteristics while meeting stringent air emissions standards. Personal vehicles in the second set sacrifice performance for maximum fuel economy. Vehicles in the third set are more fuel efficient than 1980 vehicles but do not represent significant technological improvements from present vehicles. A forecasting vehicle characteristics method data for performance, fuel economy, and purchase price for each vehicle are presented. New engine technologies were introduced in every set, including diesel, Stirling, and Brayton engines, stratified charge Otto engines, and electric and hybrid vehicles. Technology development for transit vehicles paralleled that of autos. DOE

N83-13516# Oak Ridge National Lab., Tenn.
BIOMEDICAL AND ENVIRONMENTAL SCIENCES PROGRAMS AT THE OAK RIDGE NATIONAL LABORATORY
 E. L. PRESTON, comp. and J. A. GETSI, comp. Jul. 1982 69 p
 (Contract W-7405-ENG-26)
 (DE82-019897; ORNL/TM-8448) Avail: NTIS HC A04/MF A01

A major objective of the biomedical and environmental sciences research at the Oak Ridge National Laboratory is to provide information on environmental, health, and safety considerations that can be used in the formulation and implementation of energy technology decisions. Research is directed at securing information required for an understanding of both the short- and long-term consequences of the processes involved in new energy technologies. Investigation of the mechanisms responsible for biological and ecological damage caused by substances associated with energy production and of repair mechanisms is a necessary component of this research. The research is carried out by the staff of four divisions and one program: Biology Division, Environmental Sciences Division, Health and Safety Research Division, Information Division, and the Life Sciences Synthetic Fuels Program. Research programs underway in each of these divisions are discussed. Information on the following subjects is also included: interactions with universities; interactions with industry; technology transfer; recent accomplishments in the areas of program, publications, awards, and patents; and new initiatives. DOE

N83-13584# Office of Technology Assessment, Washington, D.C.
TECHNOLOGY AND SOVIET ENERGY AVAILABILITY: SUMMARY
 Nov. 1981 27 p refs
 (OTA-ISC-154) Avail: NTIS HC A03/MF A01

The course Soviet energy production will take if present policies in the West and the USSR remain unchanged is investigated. Opportunities and problems in the five primary Soviet energy industries: oil, gas, coal, nuclear, and electric power; equipment and technology requirements; and the implications of providing or withholding assistance are addressed. N.W.

N83-13587# National Aeronautics and Space Administration, Washington, D. C.
SECOND PROGRAM ON ENERGY RESEARCH AND TECHNOLOGIES
 Oct. 1982 117 p Transl. into ENGLISH of "Zweites Programm Energieforschung und Energietechnologien" rept. Germany Ministry for Research and Technology, Bonn, 1982 p i-iv, 1-122 Transl. by Kanner (Leo) Associates, Redwood City, Calif. (Contract NASW-3541)
 (NASA-TM-77154; NAS 1.15:77154) Avail: NTIS HC A06/MF A01 CSCL 10B

The second major energy research and development program is described. Renewable and nonrenewable energy resources are presented which include nuclear technology and future energy sources, like fusion. The current status and outlook for future progress are given. E.A.K.

N83-13594# National Bureau of Standards, Washington, D.C.
TI-59 PROGRAM FOR CALCULATING THE ANNUAL ENERGY REQUIREMENTS FOR RESIDENTIAL HEATING AND COOLING. VOLUME 1: USERS MANUAL
 F. A. COSTELLO, T. KUSUDA, and S. ASO Jul. 1982 132 p 2 Vol.
 (Contract DE-AD01-76PR-06010)
 (DE82-010174; DOE/NBB-0011-VOL-1) Avail: NTIS HC A07/MF A01

The program documentation and user's manual for the TI-59 pocket calculator program for determining annual heating and cooling energy consumption of residential buildings are given. The program embodies the Variable-Base-Degree-Day Method, which was proven to yield equivalent results as obtained by the comprehensive hour-by-hour simulation calculation, such as DOE-2. Given are step-by-step calculation procedure information on input data, sample calculations, and mathematical basis of the procedure. DOE

N83-13595# National Bureau of Standards, Washington, D.C.
TI-59 PROGRAM FOR CALCULATING THE ANNUAL ENERGY REQUIREMENTS FOR RESIDENTIAL HEATING AND COOLING. VOLUME 2: PROGRAM REFERENCE MANUAL
 T. KUSUDA, F. A. COSTELLO, S. T. LIU, and J. P. BARNETT Jul. 1982 235 p 2 Vol.
 (Contract DE-AI01-76PR-06010)
 (DE82-020275; DOE/NBB-0011-VOL-2) Avail: NTIS HC A11/MF A01

Basic mathematical formulation, program listing, and input data for the subject pocket calculator energy analysis procedure are given. The data include solar and surface weather parameters, degree-days to variable bases, sunlit factors and Earth temperature. DOE

N83-13598# Allen (Eliot) and Associates, Inc., Salem, Oreg.
GUIDE TO A GEOTHERMAL HEAT PLAN: A GEOTHERMAL ENERGY APPLICATION, SERIAL NO. 3
 Mar. 1982 39 p refs Sponsored in cooperation with Oregon Dept. of Energy Prepared for Washington State Energy Office, Olympia
 (Contract DE-FG07-79RO-00079; DE-FG51-79RO-00079)
 (DE82-020591; WAOENG-82-04) Avail: NTIS HC A03/MF A01

An atlas systematically monitors a community's thermal supplies and demands, and catalogs them in the same manner as other community development sectors. The heat plan contains thermal goals and implementation measures based on conditions and opportunities revealed in the atlas. The heat demands considered in the atlas include space, water, and industrial process heat demands. Thermal resources considered include those conventional fuels already in use, as well as those alternate energy resources which have potential for utilization. (LEW) DOE

01 ENERGY POLICIES AND ENERGY SYSTEMS ANALYSIS

N83-13606# Hittman Associates, Inc., Columbia, Md.
EVALUATION OF ESTIMATED ENERGY CONSERVATION MEASURE COSTS AND BENEFITS IN THE RESIDENTIAL MULTIFAMILY SECTOR Final Report

Sep. 1982 119 p refs
(Contract DE-AC01-79PE-70044)
(DE82-000490; DOE/PE-70044/T5) Avail: NTIS HC A06/MF A01

Supporting data for a policy review to determine how the multifamily buildings subsector is responding to market signals was sought. What role, if any, the federal government should play in encouraging conservation in multifamily buildings is discussed. The policy review seeks to develop an understanding of the current level of and trends in energy conservation activity in multifamily housing. The availability of the required data is determined and information in a form which facilitates its use by policy analysts is compiled. The results are presented in four parts. Part I provides an overview. Part II presents, in tabular form, the cost of selected retrofit items and the resulting energy and cost savings. As an aid to understanding the data in Part II, the salient assumptions underlying the data are also included in this part. Part III describes how the data in Part II were developed. DOE

N83-13613# California Univ., Berkeley. Lawrence Berkeley Lab.
Energy Performance of Buildings Group.
COMPUTERIZED INSTRUMENTED RESIDENTIAL AUDIT, VERSION 1.0. SOURCE LISTINGS

Jun. 1982 183 p
(Contract DE-AC03-76SF-00098)
(DE82-019953; LBL-PUB-448) Avail: NTIS HC A09/MF A01

The CIRA is a set of computer programs to predict the energy consumption of small buildings. It also provides an optimized list of improvements which reduce energy use. The source code in BASIC is provided to help a user adapt the program to a particular application, or to see details of the calculation algorithms. DOE

N83-13614# California Univ., Berkeley. Dept. of Nuclear Engineering.
USE OF WASTE HEAT IN DISTRICT SYSTEMS WITH CONSIDERATIONS OF SEASONAL-HEAT-DEMAND VARIATIONS

R. T. MAHINI and V. E. SCHROCK Jun. 1982 116 p refs
(Contract DE-AT03-79ET-15391)
(DE82-019923; UCB-NE-4022) Avail: NTIS HC A06/MF A01

The use of waste heat in district heating systems and considerations of seasonal heat demand variations were studied. The system employs heat pumps stationed throughout an urban center to use the waste heat from a power plant condenser coolant as their heat source and to deliver hot water in the consumer pipe line. The water from the power plant is circulated in a closed loop between the heat pump's evaporator and the power plant's condenser. The water in the distribution pipeline circulates in another closed loop between the heat pump's condenser and the consumer heat exchanger units. The city of Philadelphia was used as the reference city for population density and climatic conditions. The cost of system was calculated under various circumstances. The parameters varied were the distance between the power plant and the heat pump stations, the temperature drop of the main line water in the heat pump's evaporator, the approach temperature of the heat exchanger in the district station, the annual heat load, and the monthly variations of the heat demand. The cost of the system was computed to be between 16 to 31 mills/kwhr depending on the operating condition. DOE

N83-13617# Battelle Columbus Labs., Ohio.
TOTAL ENERGY FOOD PLANT 21 MILLION GALLON ETHANOL FACILITY Final Report

Oct. 1981 571 p refs Prepared in cooperation with Chemapec, Inc., Woodbury, Ind. and Clark Dietz Engineers, Inc., Richmond, Ind. Prepared for Agri-Answer, Inc., Union City, Ind.
(Contract DE-FG07-80RA-50329)
(DE82-019258; DOE/RA-50329/1) Avail: NTIS HC A24/MF A01

The Phase I Engineering study includes the following: process description, waste water treatment plant, material summary, energy chart, capital cost estimate, equipment list, personnel requirements, drawings list, specifications list, and project schedule. The economic and financial feasibility of the technical process, and environmental, health, safety, and socio-economic assessments for the project are reported. The costs for extending the following utilities to the property line of the selected site are presented: potable water, sewer system, electricity, roads for truck traffic, and rail service. DOE

N83-13619# Cambridge Systematics, Inc., Berkeley, Calif.
RESIDENTIAL END-USE ENERGY PLANNING SYSTEM (REEPS) Final Report

A. GOETT and D. MCFADDEN Jul. 1982 167 p refs Sponsored by Electric Power Research Inst.
(Contract EPRI PROJ. 1211-2)
(DE82-906444; EPRI-EA-2512) Avail: NTIS HC A08/MF A01

The Residential End-Use Energy Planning System (REEPS) is described. REEPS is a forecasting model of residential energy patterns that is capable of evaluating the impacts of a broad range of energy conservation measures. REEPS forecasts appliance installations, operating efficiencies, and utilization patterns for space heating, water heating, air conditioning, and cooking. Each of these decisions is sensitive to energy prices, mandatory policies, and household/dwelling and geographical characteristics. The parameters of these choice models have been estimated statistically from national household survey data. The structure of the choice models and the results of the statistical analysis are reported in detail. REEPS forecasts energy choices for a large number of market segments representing households with different socioeconomic, dwelling, and geographical characteristics. These segments reflect the joint distribution of characteristics in the population. Aggregate forecasts are generated by summing up the decisions for all population segments. This technique provides a consistent method of obtaining aggregate forecasts from disaggregate, nonlinear choice models. Moreover, it permits evaluation of the distributional impacts of prospective conservation policies. The results of simulation of REEPS are described. DOE

N83-13620# Geothermal Development Associates, Reno, Nev.
PRELIMINARY PLAN FOR THE DEVELOPMENT OF GEOTHERMAL ENERGY IN THE TOWN OF HAWTHORNE, NEVADA

4 Nov. 1981 107 p refs
(DE82-904440; NP-2904440) Avail: NTIS HC A06/MF A01

Site characteristics pertinent to the geothermal development are described, including: physiography, demography, economy, and goals and objectives of the citizens as they relate to geothermal development. The geothermal reservoir is characterized on the basis of available information. The probable drilling depth to the reservoir, anticipated water production rates, water quality, and resource temperature are indicated. Uses of the energy that seem appropriate to the situation both now and in the near future at Hawthorne are described. The essential institutional requirements for geothermal energy development are discussed, including the financial, environmental, and legal and regulatory aspects. The various steps that are necessary to accomplish the construction of the geothermal district heating system are described. DOE

01 ENERGY POLICIES AND ENERGY SYSTEMS ANALYSIS

N83-13621# Geothermal Development Associates, Reno, Nev.
**PRELIMINARY PLAN FOR THE DEVELOPMENT OF
GEOTHERMAL ENERGY IN THE TOWN OF GABBS, NEVADA**
Nov. 1981 104 p refs
(DE82-904441; NP-2904441) Avail: NTIS HC A06/MF A01

Characteristics of the site significant to the prospect for geothermal development are described, including: physiography, demography, economy, and the goals and objectives of the citizens as they relate to geothermal development. The geothermal resource evaluation is described, including the depth to reservoir, production rates of existing water wells, water quality, and the resource temperature. Uses of the energy that seem appropriate to the situation both now and in the foreseeable future at Gabbs are described. The essential institutional requirements for geothermal energy development are discussed, including the financial, environmental, legal, and regulatory requirements. The main resource, engineering and institutional considerations involved in a geothermal district heating system for Gabbs are summarized.

DOE

N83-13628# Stockholm Univ. (Sweden). Inst. of Physics.
**SOME COMMENTS ON THE WORLD ENERGY CONFERENCE
(WEC) ENERGY DEMAND MODEL**
L. BRANDELL (Royal Inst. of Tech., Stockholm) Apr. 1982 15 p refs
(USIP-82-04) Avail: NTIS HC A02/MF A01

The WEC model, relating the energy demand for a region in a year to gross national product (GNP), aggregated energy prices and elasticity constants, is generalized. The changes that result from the assumption that the elasticity factors are not constant are examined. The resulting differential equation contains the variables energy demand per capita and GNP per capita for the region considered. The effect of time lag in energy demand and the influence of the population growth rate are also included in the model. No projections of the future energy demand were made, but model sensitiveness to the modifications were studied. Time lag effects and population growth effects can raise the projected energy demand for a region by 10% or more. Author (ESA)

N83-13630# National Materials Advisory Board, Washington, D. C.
**AN ASSESSMENT OF THE INDUSTRIAL ENERGY
CONSERVATION PROGRAM, VOLUME 2 Final report, Nov. 1980
- Apr. 1982**
May 1982 191 p refs
(Contract DE-AC01-80CS-40298)
(PB82-225780; NMAB-395-2) Avail: NTIS HC A09/MF A01
CSCL 10A

Industrial operations in the United States consume some 37 percent of the country's total energy, and it was estimated that this percentage will increase to 50 percent by 1990 unless appropriate conservation measures are applied. However, such measures are difficult to implement in spite of the potential offered by various technologies. Accordingly, a federal program was started in 1975 designed to mitigate the economic, technological, and institutional uncertainties via forms of government-industry partnership arrangements. The National Materials Advisory Board was requested in June 1980 to form a study committee to assess the effectiveness of the Industrial Energy Conservation Program which is administered by the Department of Energy. GRA

N83-13644*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
**AN ASSESSMENT OF GAS-SIDE FOULING IN CEMENT
PLANTS**
W. J. MARNER Sep. 1982 109 p refs Sponsored in part by DOE
(NASA-CR-169513; JPL-PUB-82-83; NAS 1.26:169513;
DOE/ID-12138/2) Avail: NTIS HC A06/MF A01 CSCL 13B

The cement industry is the most energy-intensive industry in the United States in terms of energy cost as a percentage of the total product cost. An assessment of gas-side fouling in cement plants with special emphasis on heat recovery applications is

provided. In the present context, fouling is defined as the buildup of scale on a heat-transfer surface which retards the transfer of heat and includes the related problems of erosion and corrosion. Exhaust gases in the cement industry which are suitable for heat recovery range in temperature from about 100 to 1300 K, are generally dusty, may be highly abrasive, and are often heavily laden with alkalies, sulfates, and chlorides. Particulates in the exhaust streams range in size from molecular to about 100 micrometers in diameter and come from both the raw feed as well as the ash in the coal which is the primary fuel used in the cement industry. The major types of heat-transfer equipment used in the cement industry include preheaters, gas-to-air heat exchangers, waste heat boilers, and clinker coolers. At the present time, the trend in this country is toward suspension preheater systems, in which the raw feed is heated by direct contact with the hot kiln exit gases, and away from waste heat boilers as the principal method of heat recovery. The most important gas-side fouling mechanisms in the cement industry are those due to particulate, chemical reaction, and corrosion fouling. Author

N83-13647# Brookhaven National Lab., Upton, N. Y. Biomedical and Environmental Assessment Div.
**A REFERENCE MATERIAL SYSTEM FOR ESTIMATING HEALTH
AND ENVIRONMENTAL RISKS OF SELECTED MATERIAL
CYCLES AND ENERGY SYSTEMS**
M. A. CROWTHER and P. D. MOSKOWITZ Jul. 1981 120 p refs
(Contract DE-AC02-76CH-00016)
(DE82-019309; BNL-51563) Avail: NTIS HC A06/MF A01

Samples analyses and detailed documentation are presented for a Reference Material System (RMS) to estimate health and environmental risks of different material cycles and energy systems. Data inputs described include: end-use material demands, efficiency coefficients, environmental emission coefficients, fuel demand coefficients, labor productivity estimates, and occupational health and safety coefficients. Application of the model permits analysts to estimate fuel use (e.g., Btu), occupational risk (e.g., fatalities), and environmental emissions (e.g., sulfur oxide) for specific material trajectories or complete energy systems. Model uncertainty is quantitatively defined by presenting a range of estimates for each data input. Systematic uncertainty not quantified relates to the boundaries chosen for analysis and reference system specification. Although the RMS can be used to analyze material system impacts for many different energy technologies, it was specifically used to examine the health and environmental risks of producing four types of photovoltaic devices. DOE

N83-13649# Marine Biological Lab., Woods Hole, Mass. Ecosystems Center.
**EFFECTS OF OIL ON TUNDRA PONDS AND STREAMS Final
Report, 1 Oct. 1978 - 30 Sep. 1980**
J. E. HOBBIIE May 1982 13 p refs
(Contract DE-AC02-76EV-02989)
(DE82-018899; DOE/EV-02989/2) Avail: NTIS HC A02/MF A01

The effects of nutrient enrichment on an arctic tundra stream were studied in 1979 and 1980. The site was the Kuparuk River of the North Slope of Alaska. Concentrations of phosphorus and nitrogen in the river were extremely low, and phosphorus was indicated as the most important limiting nutrient. An artificial stream was set up to observe the effects of added nutrients on periphyton biomass and photosynthesis. The phosphorus and phosphorus plus nitrogen enrichments showed significant increase in algal growth and production over the controls. Nitrogen alone gave no stimulus. The effects of petroleum hydrocarbons on the decomposition of plant litter was observed in an experimental setup simulating conditions in Toolik Lake, Alaska. Overall microbial activity and heterotrophic activity ((¹⁴C acetate uptake) indicated no significant short term effect after oil addition. In longer experiments, the decomposition rate of lignin and cellulose components of Carex was observed by following (¹⁴C labelled compounds. DOE

01 ENERGY POLICIES AND ENERGY SYSTEMS ANALYSIS

N83-13651# Saarberg-Fernwaerme G.m.b.H., Saarbruecken (West Germany).

SFW-FUNK PROCESS FOR GASIFICATION OF SOLID URBAN AND INDUSTRIAL WASTE Final Report, Jul. 1980

H. HUMMELSIER and F. HEINRICH Bonn Bundesministerium fuer Forschung und Technologie Aug. 1982 230 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-T-82-117; ISSN-0340-7608) Avail: NTIS HC A11/MF A01

The development and testing of an urban and industrial waste gasification plant are described. Domestic waste of different composition, grain size and closeness of grain and rubber and wood were gasified at varying operating conditions (composition, quantity and constitution of the oxidant) with good results.

Author (ESA)

N83-13652# Saarberg-Fernwaerme G.m.b.H., Saarbruecken (West Germany)

MEASURING PROGRAM FOR THE R AND D PROJECT ON GASIFICATION OF DOMESTIC AND INDUSTRIAL WASTES Final Report, Jun. 1981

H. HUMMELSIER and E. LOEW Bonn Bundesministerium fuer Forschung und Technologie Jul. 1982 86 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-T-82-118; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 18

Domestic and industrial waste incoming and outgoing material flows were analyzed. Waste as input material, screened fine fraction, gas produced, crude gas condensate (part tar - part water), ash produced, circulating water cooling, water ashbowl, fine fraction eluate, ash eluate, and waste water were examined. Quantities, compositions, energy content and pollutant quota are determined. Energy and mass relationships are derived.

Author (ESA)

N83-13657# Rockwell International Corp., Newbury Park, Calif. **QUALITY ASSURANCE IN SUPPORT OF ENERGY RELATED MONITORING ACTIVITIES Annual Report**

M. LEV-ON and M. CHER Apr. 1982 56 p refs (Contract EPA-68-02-2412) (PB82-234238; EPA-600/4-82-036; AR-3) Avail: NTIS HC A04/MF A01 CSCL 13B

The activities during the third year of the program entitled, Quality Assurance in Support of Energy Related Activities are discussed. Discussed are the regularly scheduled quality control reference sample audits conducted for the analysis of sulfate, nitrate, sulfur dioxide, nitrogen dioxide and carbon monoxide, and for weight measurement and high-volume flow rate. Performance results for the third year of the program remained essentially constant for sulfate, nitrate, sulfur dioxide and carbon monoxide. The results for carbon monoxide are noteworthy for their consistently high quality. Results for nitrogen dioxide show some improvement.

GRA

N83-13658# Systems Applications, Inc., San Rafael, Calif. **EVALUATION OF SHORT-TERM NO₂ PLUME MODELS FOR POINT SOURCES. VOLUME 1. TECHNICAL DISCUSSION Final Report, Aug. 1977 - Jul. 1979**

M. A. YOCKE, D. A. STEWART, J. JOHNSON, and R. J. FROST Dec. 1981 194 p refs (Contract EPA-68-02-2775) (PB82-234329; EPA-600/4-81-079) Avail: NTIS HC A09/MF A01 CSCL 13B

Models for predicting short term NO₂ concentrations are discussed, and several (RPM-II, TCM, OLM, and CNOM) are selected for evaluation. The MISTT data, collected in 1976, were to be used to evaluate the models, but careful scrutiny of the data base revealed certain deficiencies relative to the data needs of the models. These deficiencies preclude a strict evaluation of the performance of the models, but simple fitting techniques were used to compensate for input data deficiencies. The models are shown to perform reasonably well using simple statistical measures

of performance. The performance of the models is also evaluated using a 'restricted' data base (i.e., one that could be derived from NSW, local, or state agency data sources only), and model performance is shown to be poorer with the unrestricted data base.

Author (GRA)

N83-13659# Southern Research Inst., Birmingham, Ala. **SAMPLING FOR HIGH-MOLECULAR-WEIGHT ORGANIC COMPOUNDS IN POWER PLANT STACK GASES Final Report**

W. R. DICKSON, H. C. MILLER, and W. J. BARRETT May 1982 50 p (Contract EPA-68-02-2272)

(PB82-234618; SORI-EAS-80-387; EPA-600/7-82-039) Avail: NTIS HC A03/MF A01 CSCL 13B

The results of laboratory and field investigations of experimental sampling systems intended to collect high molecular-weight organic compounds from flue gases in coal-fired power plants are presented. The most promising sampling device was a solid sorbent cartridge inserted directly into the flue gas stream and cooled to a temperature just above the dew point by a forced flow of external ambient air. Although certain sorbent materials were shown to be partially effective for the collection of vapors of polynuclear aromatic hydrocarbons at temperatures of 50 to 60 C, no completely satisfactory sorbent was found. Ambersorb XE340, a nonpolar carbonaceous sorbent, was the most satisfactory of several organic and inorganic sorbent materials tried, but its usefulness was limited by the presence of contaminants that could not be removed.

Author (GRA)

N83-13664# Radian Corp., Austin, Tex. **IMPACT OF NO_x SELECTIVE CATALYTIC REDUCTION PROCESSES ON FLUE GAS CLEANING SYSTEMS Final Report, Oct. 1980 - Oct. 1981**

G. D. JONES, R. L. GLOVER, G. P. BEHRENS, and T. E. SHIRLEY Apr. 1982 103 p refs (Contract EPA-68-02-3171) (PB82-240086; RAD-81-202-187-70-15; EPA-600/7-82-025B) Avail: NTIS HC A06/MF A01 CSCL 13B

The report gives results of a study of the impact of the ammonia leaving a nitrogen oxide (NO_x) selective catalytic reduction (SCR) process on downstream flue gas cleaning processes. (NO_x emissions from electric utility boilers may be reduced 80-90% by the application of pollution control technology based on the SCR of NO_x with ammonia; however, some unreacted ammonia may be emitted from the control system.) These processes include electrostatic precipitators (ESPs), baghouses, and flue gas desulfurization (FGD) systems. In normal operation, most ammonia leaving the SCR system will be removed, either as particulate salts by the particulate removal system or as free ammonia by the FGD system. Very little ammonia should be emitted at the stack.

Author (GRA)

N83-13665# Acurex Corp., Mountain View, Calif. **ENVIRONMENTAL ASSESSMENT OF STATIONARY SOURCE NO_x CONTROL TECHNOLOGIES Final Report, Jun. 1976 - Sep. 1979**

L. R. WATERLAND, K. J. LIM, E. B. HIGGINBOTHAM, R. M. EVANS, and H. B. MASON May 1982 339 p refs (Contract EPA-68-02-2160) (PB82-249350; EPA-600/7-82-034; REPT-80-57/EE) Avail: NTIS HC A15/MF A01 CSCL 13B

Results of a 3-year evaluation of combustion modification controls for emissions of NO_x and other pollutants from stationary combustion sources are given. Results include field tests of gaseous, liquid, and solid effluents from seven stationary sources; estimates of environmental effects of using combustion modification control; evaluation of NO_x control reduction effectiveness, capital and operating costs, and operational impact for several levels of control; projection of control technology needs to the year 2000 for several scenarios of energy growth and environmental regulations; and inventories of nationwide stationary source emissions for major pollutants and emission projections to the

01 ENERGY POLICIES AND ENERGY SYSTEMS ANALYSIS

year 2000. Three utility boilers, two industrial boilers, a gas turbine, and a low-emission residential heating system were tested. GRA

N83-13666# Ebon Research Systems, Washington, D.C.
EMERGING TECHNOLOGIES FOR THE CONTROL OF HAZARDOUS WASTES Final Report
 B. H. EDWARDS, J. N. PAULLIN, and K. COGHLAN-JORDAN
 Mar. 1982 158 p refs
 (Contract EPA-68-03-2787)
 (PB82-236993; EPA-600/2-82-011) Avail: NTIS HC A08/MF
 A01 CSCL 13B

Technologies for the disposal of hazardous wastes were investigated. The need for a data base for emerging hazardous waste technologies was evaluated. Information on the emerging technologies was acquired by computerized search, library searching, and personal contacts. Technologies discussed include: molten salt combustion, fluidized bed incineration, high energy electron treatment of trace organic compounds in aqueous solution, the catalyzed wet oxidation of toxic chemicals, dehalogenation of compounds by treatment with ultraviolet (UV) light and hydrogen, UV/chlorinolysis of organics in aqueous solution, the catalytic hydrogenation-dechlorination of polychlorinated biphenyls (PCB's), and ultraviolet/ozone destruction. Theory, specific wastes treated, and economics are discussed. GRA

N83-13669# Miami Univ., Coral Gables, Fla. Dept. of Mechanical Engineering.
PROCEEDINGS OF THE 3RD CONFERENCE ON WASTE HEAT MANAGEMENT AND UTILIZATION
 May 1982 953 p refs Conf. held at Miami Beach, Fla., 11-13 May 1981 Sponsored by EPA
 (PB82-227901; EPA-600/9-82-008) Avail: NTIS HC A99/MF
 A01 CSCL 13B

The conference addressed programs in waste heat management and utilization, utilization of waste heat from industrial processes, thermal discharges and related phenomena, cooling towers and their effects, greenhouse applications of waste heat, environmental effects of waste heat discharges to water bodies, and management and regulatory aspects of waste heat. GRA

N83-13670# Municipal Environmental Research Lab., Cincinnati, Ohio. Wastewater Research Div.
TECHNOLOGY ASSESSMENT OF ANAEROBIC SYSTEMS FOR MUNICIPAL WASTEWATER TREATMENT: PART 1. ANAEROBIC FLUIDIZED BED. PART 2. ANFLOW Final Report, Aug. 1980 - Aug. 1981
 J. A. HEIDMAN Feb. 1982 59 p refs
 (PB82-229170; EPA-600/2-82-004) Avail: NTIS HC A04/MF
 A01 CSCL 13B

Two developing technologies for the treatment of municipal wastewaters are described. These technologies are anaerobic fluidized bed systems and an anaerobic fixed-film bioreactor (ANFLOW). The topics discussed include: available laboratory data on system performance, fluidized bed expansion and voidage-velocity relationships; the influence of bacterial growth on changes in fluidization characteristics; power requirements for fluidization; potential cost and energy savings compared to activated sludge secondary treatment plants; and estimates of anaerobic fluidized bed treatment costs. GRA

N83-13972# State Planning Council on Radioactive Waste Management, Washington, D.C.
RECOMMENDATION ON NATIONAL RADIOACTIVE WASTE MANAGEMENT POLICIES Report to the President
 1981 67 p
 (DE81-029916; DOE/TIC-1029916) Avail: NTIS HC A04/MF
 A01

Sound technical solutions to the problems of waste disposal cannot be carried out without public acceptance. The key to gaining the public's confidence is a process of decision making which is open and accessible to elected officials from all levels of government. Such a process can be put in place through a renewal of the traditional principles of the federal system of government

State, local, and tribal officials must become working partners with the federal government in making the crucial decisions about how radioactive wastes will be handled, transported, and ultimately disposed. A workable and effective partnership must include, first the full sharing of information and plans regarding waste disposal activities among all levels of government and, second, the opportunity for state, local, and tribal governments to participate effectively in waste management decisions which affect their jurisdictions. DOE

N83-13973# Du Pont de Nemours (E. I.) and Co., Aiken, S.C.
PARAMETRIC STUDY OF GEOHYDROLOGIC PERFORMANCE CHARACTERISTICS FOR NUCLEAR-WASTE REPOSITORIES
 C. E. BAILEY and I. W. MARINE 1981 19 p refs Presented at the Geol. Soc. of Am. Meeting, Cincinnati, 2-5 Nov. 1981
 (Contract DE-AC09-76SR-00001)
 (DE82-003145; DP-MS-81-36; CONF-811142-1) Avail: NTIS HC A02/MF A01

Geohydrologic information in graphical form covering a wide range of parameters to aid in determining site specifications based on functional criteria are presented. Graphs of the major performance characteristics that influence the transport of radionuclides from a repository to the biosphere by groundwater are developed. The major characteristics addressed are radioactive decay, leach rate, hydraulic conductivity, porosity, groundwater gradient, hydrodynamic dispersion, ion exchange, and distance to the biosphere. GRA

N83-13976# California Univ., Livermore. Lawrence Livermore Lab.
SYNROC PROCESSING OPTIONS
 R. B. ROZSA and C. L. HOENIG 1 Sep. 1981 16 p refs
 (Contract W-7405-ENG-48)
 (DE82-004230; UCRL-53187) Avail: NTIS HC A02/MF A01

Synroc is a titanate-based ceramic material currently being developed for immobilizing high-level nuclear reactor wastes in solid form. Synroc D is a unique variation of Synroc. It can contain the high-level defense wastes, particularly those in storage at the Savannah River Plant. The early development of the initial Synroc process is reviewed, modification and other options that simplify it overall are discussed, and the future direction of research and development in the processing area is recommended. A reference Synroc process is described and contrasted with the Savannah River Laboratory glass-based reference case. Preliminary engineering layouts show Synroc to be a more complex processing operation and, thus, more expensive than the glass-based process. Possible simplifications, can significantly reduce the cost difference. Research and development continues in the areas of slurry processing, fluidized bed calcination, and mineralization using sintering, hot uniaxial pressing, or hot isostatic pressing. DOE

N83-13977# Centro Informazioni Studi Esperienze, Milan (Italy).
THE EXPERIENCE COLLECTED IN THE MANAGEMENT OF THE CENTRO INFORMAZIONI STUDI ESPERIENZE (CISE) RADIOACTIVE WASTE FROM 1960 TO 1980 [ESPERIENZE ACQUISITE NELLA GESTIONE DEI RIFIUTI RADIOATTIVI AL CISE DAL 1960 AL 1980]
 C. TRIULZI and N. CARIFI 1981 18 p refs In ITALIAN
 Presented at 22nd A.I.R.P. Congr., Gardone, Italy, 23-26 Jun. 1981
 (CISE-1738) Avail: NTIS HC A02/MF A01

The radioactive waste produced in a research center, its processing and destination are described. The radioactive waste is mainly solid (26 cu m) or inorganic liquid (65 cu m), although some paste (3 cu m) and organic liquids (0.1 cu m) were also produced. The disposal in each material category is described, including a block diagram of the liquid radioactive waste treatment plant. A time table shows that at the end of the period the stock of radioactive waste was reduced to 10 cu m. Author (ESA)

01 ENERGY POLICIES AND ENERGY SYSTEMS ANALYSIS

N83-14074# Comptroller General of the United States, Washington, D.C.

AIRCRAFT THRUST/POWER MANAGEMENT CAN SAVE DEFENSE FUEL, REDUCE ENGINE MAINTENANCE COSTS, AND IMPROVE READINESS

29 Jul. 1982 51 p refs

(GAO/PLRD-82-74) Avail: NTIS HC A04/MF A01

It was found that the Department of Defense could achieve additional savings in aircraft fuel and reduce engine maintenance costs by making greater use of reduced power takeoffs and climbs by fighter aircraft. It is recommended that effective local initiatives be better identified, reviewed, and implemented whenever possible.

R.J.F.

N83-14116# Logistics Management Inst., Washington, D. C.
IMPROVING ENERGY EFFICIENCY OF MAJOR WEAPON SYSTEMS Final Report

D. J. S. PETERSON and C. D. STEVENSON Jul. 1982 50 p refs

(Contract MDA903-81-C-0166)

(AD-A119563; LMI-ML111) Avail: NTIS HC A03/MF A01
CSCL 21D

The increasing cost of fuel consumed by major weapon systems is a continuing concern for the Department of Defense (DoD). Because fuel costs are growing more rapidly than other Operating and Support (O&S) costs, they are consuming a growing fraction of the O&S budget. One solution to the problem is to place greater emphasis on acquiring energy efficient weapon systems. The efficient use of energy in major systems will help assure that the DoD will get the highest level of performance for every fuel dollar spent. The major system acquisition process serves as the framework for incorporating energy efficiency into system design and development. Not all systems are energy intensive and not all would benefit from increased attention to energy. This report defines a method for determining which systems are energy intensive using an energy consumption threshold specific to the warfare area of the system under consideration. We recommend that systems designated energy intensive be subjected to a more detailed analysis of energy consumption and cost, including the sensitivity of system life cycle costs to changes in energy costs. The report provides a case study to demonstrate how the recommended analytical methods can be performed within the life cycle cost analysis required for major weapon systems.

Author (GRA)

N83-14302# Oak Ridge National Lab., Tenn
HEALTH EFFECTS RESEARCH IN DIRECT COAL LIQUEFACTION. STUDIES OF H-COAL DISTILLATES. PHASE 1: PDU SAMPLES; THE EFFECTS OF HYDROTREATMENT

J. L. EPLER, R. J. M. FRY, and F. W. LARIMER Nov. 1981 66 p refs

(Contract W-7405-ENG-26)

(DE82-003702; ORNL/TM-8071) Avail: NTIS HC A04/MF A01

A multi-divisional effort aimed at the integrated assessment of the health and environmental effects of various coal conversion and shale oil technologies is discussed. The feasibility of using health effects bioassays to predict the potential biohazard of various H-Coal derived test materials is examined in a coupled chemical and biological approach. The primary focus is the use of preliminary chemical characterizations and preparation for bioassay, followed by testing in short-term assays in order to rapidly ascertain the potential biohazard. Mammalian toxicological assays parallel the testing. Raw and hydrotreated product liquids from process development units of H-Coal and the pilot plant solvent refined coal process were examined for acute toxicity monitored as population growth impairment of *Tetrahymena* exposed to aqueous extracts and for mutagenic activity monitored as revertants of *Salmonella* exposed to metabolically activated chemical class fractions. Medium to high severity hydrotreatment appears to be an effective means of reducing biological activity.

DOE

N83-14312# Escher Technology Associates, St. Johns, Mich
Div of Paper Machines.

AIR CIRCUIT WITH HEAT PUMP

H. HOLIK, H. J. BAUDER, H. BRUGGER, A. REINHART, and K. H. SPOTT Dec. 1980 39 p refs Transl. into ENGLISH of "Luftkreislauf mit Wärmepump" rept. Bundesministerium fuer Forschung und Technologie, Bonn Original language document was announced as N82-12404

(PB82-221219; BMFT-FB-T-80-188) Avail: NTIS HC A03/MF A01 CSCL 13A

In the production of paper, a water quantity of approximately 1.5 times the weight of the finished paper is vaporized. The energy needed for this is lost in the ensuing water vapor during the drying process. It is demonstrated that energy consumption in drying paper can be reduced by using a heat pump to heat the blown air instead of the conventional steam heating. The exhaust from the drying section serves to supply heat for the pump.

GRA

N83-14575*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

AUTOMATIC INTERPRETATION OF MSS-LANDSAT DATA APPLIED TO COAL REFUSE SITE STUDIES IN SOUTHERN SANTA CATARINA STATE, BRAZIL

N. D. J. PARADA, Principal Investigator, H. J. H. KUX, and D. D. M. VALERIANO May 1982 12 p refs Presented at the 16th Intern. Symp. on Remote Sensing of Environ., Buenos Aires, 2-9 Jun. 1982 Sponsored by NASA Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS

(E83-10066; NASA-CR-169577; NAS 1.26:169577;

INPE-2410-PRE/119) Avail: NTIS HC A02/MF A01 CSCL 05B

The coal mining district in southeastern Santa Catarina State is considered one of the most polluted areas of Brazil. The author has identified significant preliminary results on the application of MSS-LANDSAT digital data to monitor the coal refuse areas and its environmental consequences in this region.

Author

N83-14664# General Accounting Office, Washington, D. C.
DEVELOPING ALASKA'S ENERGY RESOURCES: ACTIONS NEEDED TO STIMULATE RESEARCH AND IMPROVE WETLANDS PERMIT PROCESSING

17 Jun. 1982 93 p refs

(GAO/EMD-82-44; B-204637) Avail: NTIS HC A05/MF A01, SOD HC \$3.25

A need for additional Arctic research is identified and changes in the Corps of Engineers' wetlands permitting process are called for. This review was conducted to determine the effectiveness of Federal agencies' efforts to minimize the negative environmental impacts of oil and gas-related activities on Federal lands in Alaska.

L.F.M.

N83-14734# European Space Research and Technology Center, Noordwijk (Netherlands).

OUTLOOK FOR SPACE ENERGY SYSTEMS AT THE END OF THE THREE-YEAR ASSESSMENT

D. KASSING In ESA Photovoltaic Generators in Space p 277-284 Jun. 1982 refs

Avail: NTIS HC A15/MF A01

Satellite power transmission to Earth was studied. The technical feasibility and economic practicality of photovoltaic conversion subsystems are reviewed and consequences for Europe for future R and D in related areas are discussed. A satellite power system based on multiband gap GaAs cells is commercially feasible, although state of the art silicon cells could be used in early experiments. The concept is more attractive for Europe than for the United States, whose domestic energy production capacity is probably adequate for the next three or four decades.

Author (ESA)

01 ENERGY POLICIES AND ENERGY SYSTEMS ANALYSIS

N83-14739# Newcomb and Boyd, Atlanta, Ga.
CONTROLLING ENERGY CONSUMPTION IN SINGLE BUILDINGS Final Report, period ending May 1982
 J. REES Jul 1982 111 p refs
 (Contract N62583-81-MR-593)
 (AD-A118898; NCEL-CR-82.028) Avail: NTIS HC A06/MF A01
 CSCL 13A

This report contains guidelines for using microprocessor-based equipment to control energy in buildings. Energy conservation control strategies are discussed and simplified energy savings calculations explained. The results of a survey of currently available equipment suitable for use as energy controllers is included as well as selection guidance for which class of equipment will provide the needed features. GRA

N83-14745# Department of Energy, Washington, D. C. Wind Energy Technology Div.
PROSPECTS FOR FOREIGN APPLICATIONS OF WIND-ENERGY SYSTEMS, PRELIMINARY REPORT IN RESPONSE TO PUBLIC LAW 96-345

4 Nov. 1981 18 p refs
 (DE82-007930; DOE/NBM-1005) Avail: NTIS HC A02/MF A01

Potential foreign applications were identified. Specific systems which would most closely match the applications requirements from a list of representative U.S. wind energy systems. The energy situation of each of 155 countries and 29 territories was reviewed. Wind resources availability for each country was assessed from existing data sources. The export potential was determined by analyzing a country's applications requirements, cost of alternative energy, financial condition, interest in the development of renewable energy technologies, and level of indigenous competition DOE

N83-14753# Delaware State Solid Waste Authority, Dover.
ENERGY RESOURCE RECOVERY FACILITY FOR KENT AND SUSSEX COUNTIES, DELAWARE

Nov. 1981 180 p Prepared jointly with CSI Resource Systems, Inc.
 (Contract DE-FG01-79CS-20234)

(DE82-002539; DOE/CS-20234-1) Avail: NTIS HC A09/MF A01
 An outline of factors which should be considered in planning a solid waste facility is presented. The following topics are considered: (1) information on the technical findings; (2) existing waste disposal facilities, future systems, and waste characteristics; (3) markets for the waste resources are identified; (4) presents a rational means for site evaluation by assigning numerical values to four principal factors in decision making; (5) the refuse derived fuel system and the modular combustion system is described; (6) risks and implementation issues for the most promising systems are identified. GRA

N83-14757# Pacific Northwest Lab., Richland, Wash.
ENVIRONMENTAL AND REGULATORY ASPECTS OF COMPRESSED-AIR ENERGY STORAGE

M. A. BECKWITH and J. MATHUR 1981 10 p refs Presented at Intern. Energy Storage Conf., Seattle, 19 Oct. 1981
 (Contract DE-AC06-76RL-01830)
 (DE82-003868; PNL-SA-9500; CONF-811066-4) Avail: NTIS HC A02/MF A01

The effects of fuel regulations, environmental protection laws, the National Environmental Policy Act, underground injection regulations, and state regulations on the development of compressed air storage systems and power plants are discussed. It is concluded that environmental regulatory concerns of conventional energy technologies are often different from those associated with new technologies such as compressed air energy storage (CAES). Confusion and uncertainty often results when the current environmental regulatory system is applied to new technologies. Evolution of the regulatory system must accompany and rapidly accommodate technological development if the benefits of such development are to be fully realized in a timely manner. Those responsible for technological development in the energy field must be aware of these disparities and conduct their efforts accordingly. DOE

N83-14765# Centro Informazioni Studi Esperienze, Milan (Italy). Documentation Service.

REGIONAL ENERGY PLANNING: SOME SUGGESTIONS TO PUBLIC ADMINISTRATION [PIANIFICAZIONE ENERGETICA TERRITORIALE: ALCUNI SUGGERIMENTI AGLI AMMINISTRATORI PUBBLICI]

R. SOZZI 1982 21 p In ITALIAN Presented at Sem. sul Piano per l'Uso Razionale dell'Energia in Emilia-Romagna, Bologna, 21 May 1982

(CISE-1795) Avail: NTIS HC A02/MF A01

A methodology is proposed to estimate the relevant data and to improve the energy efficiency in regional energy planning. The quantification of the regional energy system is subdivided in three independent parameters which are separately estimated: energy demand, energy consumption, and transformation capacity. Definitions and estimating procedures are given. The optimization of the regional planning includes the application, wherever possible, of the technologies which centralize the space-heating energy production or combine the production of electric energy with space-heating energy distribution. Author (ESA)

N83-14767# General Accounting Office, Washington, D. C.
CLEANING UP THE ENVIRONMENT: PROGRESS ACHIEVED BUT MAJOR UNRESOLVED ISSUES REMAIN

21 Jul. 1982 69 p refs 2 Vol.
 (GAO/CED-82-72, B-207657) Avail: NTIS HC A04/MF A01

Air quality, water quality, solid waste disposal, ocean dumping, and noise abatement are discussed. Acid precipitation, nonpoint sources of water pollution, ground water contamination, ocean waste disposal, compliance, and pollution control decisions comprise a list of unresolved issues. N.W

N83-14770# General Accounting Office, Washington, D. C. Energy and Minerals Div.

NUCLEAR AND COAL WASTE DISPOSAL HAMPERED BY LEGAL, REGULATORY AND TECHNICAL UNCERTAINTIES

4 May 1982 4 p refs
 (EMD-82-63; B-204622) Avail: NTIS HC A02/MF A01; also available from SOD HC \$3.25

Numerous legal, regulatory, and technical problems and uncertainties are hampering disposal of nuclear and coal fuel cycle wastes. The following issues are investigated: problems associated with waste collection and disposal, present technical capability of waste collection and disposal, present capability of the transportation system to transport wastes, disposal, regulations and uncertainties affecting waste disposal, and current status of programs aimed at resolving these issues. L.F.M.

N83-14772# Research Triangle Inst., Research Triangle Park, N.C.

BOILER EFFICIENCY AND EMISSIONS TESTING USING REFUSE-DERIVED FUEL (RDF) AND COAL Final Report, 21-26 Feb. 1982

Brooks AFB, Tex. AFOEHL Aug. 1982 54 p Prepared in cooperation with Entropy Environmentalists, Inc.
 (Contract F33615-80-D-4000; AF PROJ. 1955)
 (AD-A119291; RTI-43U-1955-14; OEHL-TR-82-017EA206HEF)
 Avail: NTIS HC A04/MF A01 CSCL 13A

This report is an evaluation of (1) boiler performance, i.e., boiler efficiency and combustion properties; and (2) environmental emissions, i.e., electrostatic precipitator performance, particulate emissions (size and resistivity), gaseous emissions (SO_x, NO_x, CO and HC) and trace organics; while burning the following three fuel combinations at maximum boiler capacity: (1) 100% coal, (2) 40/60 refuse-derived fuel (RDF) to coal; and (3) 100% RDF.

Author (GRA)

01 ENERGY POLICIES AND ENERGY SYSTEMS ANALYSIS

N83-14774# Monsanto Research Corp., Miamisburg, Ohio.
TRITIUM WASTE CONTROL: OCTOBER 1980 - MARCH 1981
P. H. LAMBERGER and M. L. ROGERS 19 Oct. 1981 18 p
refs

(Contract DE-AC04-76DP-00053)
(DE82-002088; MLM-2844) Avail: NTIS HC A02/MF A01

The Combined Electrolysis Catalytic Exchange (CECE) pilot system was operated for 88 days and processed over 500 liters of tritiated water. Two complete electrolysis systems, each using a General Electric Company solid polymer electrolyte (SPE) cell, have been built. One of these is being used for the 10 Ci/ml tritiated water test and the other as a control with nontritiated water. The first SPE failed after seven weeks of exposure to the 10 Ci/ml water. A new SPE was installed and has been operated for eight weeks without failure at 10 Ci/ml. Analyses for 10 types of impurities were made on each of 15 Effluent Recovery System (ERS) liquid waste samples. A pilot-scale system for removal of these impurities has been designed and is being built. Gas generation rates caused by radiolysis of tritium waste materials were determined for polymer and nonpolymer impregnated tritiated concrete. The construction of the new addition to the liquid waste handling facility was completed. DOE

N83-14776# Pennsylvania State Univ., University Park. Dept. of Chemistry.

DEVELOPMENT OF INSTRUMENTAL METHODS OF ANALYSIS OF SULFUR COMPOUNDS IN COAL-PROCESS STREAMS
Quarterly Progress Report, Jul. - Sep. 1981

J. JORDAN, J. STAHL, and J. E. YAKUPKOVIC Oct. 1981 35 p
refs

(Contract DE-AC22-77ET-10482)
(DE82-003291; DOE/ET-10482/T3) Avail: NTIS HC A03/MF A01

The polarography of mixtures containing HS(-1), S4(-2) and S5(-2) was investigated at the dropping mercury electrode in aqueous supporting electrolytes of pH 8.7 and 9.4. Cathodic waves were obtained which exhibited a large polarographic maximum, followed by a well-defined limiting current region. The limiting current was proportional to the sum of S4(-2) + S5(-2) anomaly that interfered at pH 12, viz., a dip in the limiting current spanning half a volt, was minimized at pH less than 9. Thermochemical data collection, storage, and analysis were fully computerized. Thermometric enthalpy titration curves (TET) were computer corrected to yield an enthalpogram in terms of net heats of chemical reactions plotted versus time. Non-idealities such as heat capacity changes and extraneous heat losses were automatically compensated. A thermochemical method for determining polysulfides, utilizing HMB as a titrant, was validated in an aqueous coal liquefaction process stream. DOE

N83-14778# Oak Ridge National Lab., Tenn. Environmental Sciences Div.
EFFECTS OF ACID PRECIPITATION ON ELEMENTAL TRANSPORT FROM TERRESTRIAL TO AQUATIC ECOSYSTEMS

D. W. JOHNSON 1981 9 p refs Presented at the Intern. Conf. on Energy Use Management, 3, West Berlin, 26 Oct. 1981
(Contract W-7405-ENG-26)
(DE82-002739; CONF-811006-7) Avail: NTIS HC A02/MF A01

Significant progress was made in terrestrial aquatic transport methodology. Several techniques and conceptual frameworks are available for assessment of acid rain effects on these transport processes. It is possible to assess the relative effects of acid rain vs natural, internal acid production on elemental transfer rates is assessed by anion model. Sensitivity must be defined for ecosystem and effects that are considered. Criteria are developed, but there is a major need for more information on natural acid production. GRA

N83-14781# Battelle Pacific Northwest Lab., Sequim, Wash. Marine Research Lab.

COAL FLY ASH DISPOSAL IN THE OCEAN: AN ALTERNATIVE WORTH CONSIDERING

E. A. CRECELIUS 1981 20 p refs Presented at the 3d Intern. Ocean Dumping Symp., Woods Hole, Mass., 12 Oct. 1981
(Contract DE-AC06-76RL-01830)
(DE82-003835; PNL-SA-9657; CONF-8110104-3) Avail: NTIS HCA02/MF A01

Chemical and biological experiments measured the solubility of 16 elements in coal fly ash and the short-term toxicity of coal fly ash to clams and phytoplankton. Of the elements studied, 10 to 60% of the As, Br, Cr, Sb, Se, Ni, Pb, and Sr dissolved within a 24-hour period. Elements which were less than 10% soluble in 24-hours included Cu, Zn, Na, La, Sc, Fe, Co and Eu. Littleneck clams (*Protothaca staminea*) were exposed to coal fly ash in flowing seawater for a 25-day period. The addition of soluble coal fly ash material had no effect on the carbon uptake rate of phytoplankton. These measurements were made in the productive Washington shelf water during August. The literature indicates coal fly ash has a relatively low toxicity to plants and animals. Disposal methods could be designed so water quality criteria levels would not be exceeded except in the immediate vicinity of the dumpsite. DOE

N83-14783# Grosskraftwerk A.G., Mannheim (West Germany). Abteilungsleitung Forschung und Entwicklung.

IMPROVEMENT OF ELECTROSTATIC PRECIPITATORS PERFORMANCE THROUGH CONDITIONING BY FLUE GAS Final Report, Apr. 1981

E. JURY Bonn Bundesministerium fuer Forschung und Technologie Jul. 1982 63 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-123; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 13,50

The influence of conditioning of flue gas by water on the performance of electrostatic precipitators was investigated in connection with power station precipitators, since the increasing use of coal of varying characteristics may considerably aggravate operating conditions. After the air preheater, water is injected through spraying nozzles into an evaporation vessel to cool down the flue gas. The precipitator efficiency rises, e.g. with flue gas cooled down from 154 to 90 C, from 89 to 97.6 %. The plant worked troublefree for 22 months. Conditioning by water can be applied in the case of cyclone boilers. The precipitator size can be reduced. The reduction of the temperature permits an adaptation to the coal characteristics. Author (ESA)

N83-14968# Council for Scientific and Industrial Research, Pretoria (South Africa). Dept. of Mineral and Energy Affairs.

ENERGY POLICY FORMULATION IN SOUTH AFRICA. APL AS A TOOL TO IDENTIFY OPTIONS

R. B. SILBERBERG In its 1st South African APL Symp. 15 p 1982 refs
Avail: NTIS HC A08/MF A01

The energy situation and the options that face the policymaker in South Africa are outlined. APL is used to develop models of the supply and demand sectors and project future energy scenarios, to provide a basis for policy formulation. The process as it is applied to coal exports, is described. E.A.K.

N83-15113# Du Pont de Nemours (E. I.) and Co., Aiken, S.C. Savannah River Lab.

VITRIFICATION OF HIGH-LEVEL RADIOACTIVE WASTE IN A SMALL-SCALE JOULE-HEATED CERAMIC MELTER

M. J. PLODINEC and G. B. WOOLSEY 1981 11 p refs Presented at the Ann. Meeting of the Mater. Res. Soc., Boston, 16 Nov. 1981

(Contract DE-AC09-76SR-00001)

(DE82-002227; DP-MS-81-54; CONF-811122-6) Avail: NTIS HC A02/MF A01

Direct feeding of actual liquid-waste slurries to the small melter is discussed. The liquid-feeding tests demonstrated that addition of premelted glass frit to the waste slurry reduces the amount of material volatilized. Results of these tests are in accord with results of large-scale tests with actual waste. DOE

N83-15114# International Atomic Energy Agency, Vienna (Austria).

PACKAGING OF RADIOACTIVE WASTES FOR SEA DISPOSAL

1981 43 p refs Presented at a Tech. Comm. Meeting on Containers and Packaging for Ocean Dumping, Vienna, 3-7 Dec. 1979

(IAEA-TECDOC-240; CONF-791266) Avail: NTIS (US Sales Only) HC A03/MF A01; DOE Depository Libraries

The Convention on the Prevention of Marine Pollution by the Dumping of Wastes and Other Matter, known as the London Dumping Convention was adopted by an inter-governmental conference in London in 1972 and came into force in 1975. In 1977, the IAEA Board of Governors agreed that there is a continuing responsibility for the IAEA to contribute to the effectiveness of the London Dumping Conventions by providing guidance relevant to the various aspects of dumping radioactive wastes at sea. In the light of the above responsibilities, the IAEA organized a Technical Committee Meeting from 3 to 7 December 1979 to assess the current situation concerning the requirements and the practices of packaging radioactive wastes for dumping at sea with a view to providing further guidance on this subject. The results of this meeting are summarized. DOE

N83-15115# Commission of the European Communities, Brussels (Belgium). Directorate General for Research, Science and Education

RISKS, REGULATION RESPONSIBILITIES AND COSTS IN NUCLEAR WASTE MANAGEMENT: A PRELIMINARY SURVEY IN THE EUROPEAN COMMUNITY

S. ORLOWSKI 1980 41 p refs

(EUR-6893) Avail: NTIS (US Sales Only) HC A03/MF A01; DOE Depository Libraries

The use of nuclear energy produces radioactive waste which may present risks of pollution for man and his environment. Their protection must be ensured by technical or institutional controls. The report examines the second, i.e., the administrative, legal and financial measures, dealing with the management of radioactive waste in existence or under consideration within the Member States of the European Community. The following aspects are studied: laws and regulations, authorities concerned, costs and financing of radioactive waste management, civil liability, national policies, international aspects of radioactive waste management. DOE

N83-15401# Michigan Univ., Ann Arbor. Dept. of Aerospace Engineering.

STUDY OF THE FORMATION OF SUBMICRON PARTICULATES GENERATED BY COAL COMBUSTION Quarterly Progress Report, 1 Jul. - 1 Oct. 1981

P. M. SHERMAN and D. R. GLASS Nov. 1981 20 p refs

(Contract DE-FG22-80PC-30305)

(DE82-003268; DOE/PC-30305/T4; QPR-4) Avail: NTIS HC A02/MF A01

The mineral matter in coal fouls boiler surfaces and produces particulates which can be detrimental to vegetation and hazardous when inhaled. The particulates emitted have been controlled to some extent by costly add-on equipment. Such equipment is more effective in removing the larger particles than the smaller particles

The smaller ones are the ones however, which can be the most hazardous. They tend to be enriched in many of the most toxic elements and are the ones that tend to stay in the lungs and may adhere to boiler surfaces. If formation of these particles can be prevented, costly clean up could be eliminated. Our purpose is to investigate the mechanisms which result in submicron particles so that we may prescribe ways to prevent their formation. This quarter has been devoted to examining some of the gross trends in the particulate emissions as a function of heat transfer and combustion parameters. DOE

N83-15659# Crane Packing Co., Morton Grove, Ill.

ENERGY EFFICIENT FACE SEAL

J. SEHNAL, J. SEDY, I. ETSION, and A. ZOBENS 11 Feb. 1982 113 p refs

(Contract NAS3-22128)

(NASA-CR-165591; NAS 1.26.165591) Avail: NTIS HC A06/MF A01 CSCL 11A

Torque, face temperature, leakage, and wear of a flat face seal were compared with three coned face seals at pressures up to 2758 kPa and speeds up to 8000 rpm. Axial movement of the mating seal parts was recorded by a digital data acquisition system. The coning of the tungsten carbide primary ring ranged from .51 micro-m to 5.6 micro-m. The torque of the coned face seal balanced to 76.3% was an average 42% lower, the leakage eleven times higher, than that of the standard flat face seal. The reduction of the balance of the coned face seal to 51.3% resulted by decreasing the torque by an additional 44% and increasing leakage 12 to 230 times, depending on the seal shaft speed. No measurable wear was observed on the face of the coned seals. E A K.

N83-15915# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

THE SERI WIND ENERGY PROGRAM

I. E. VAS (Flow Industries, Inc.) In its Fifth Bien. Wind Energy Conf. and Workshop (WW5) p 93-106 1981 refs

(Contract EG-77-C-01-4042)

Avail: NTIS HC A23/MF A01

The widespread implementation of wind energy is supported by conducting research and development studies. The activities fall into three general areas--planning, management and analysis; advanced and innovative concepts; and information development. In the first area, the work conducted relates to economic, application, legal, social and environmental studies which are generic and could be applied to a wide range of machine size and type. The second area of responsibility lies with the directing and managing of advanced and innovative concepts--those high risk concepts that offer the potential of improving upon the cost of energy of conventional systems and of increasing the wide spread implementation of wind systems into populated areas. The third area of responsibility relates to the development of informational documents which are designed for specific audiences. This activity generally supports the Solar Energy Information Data Bank in their efforts to provide general information in response to inquiries on wind energy. S.L.

N83-15955# Oak Ridge National Lab., Tenn.

ALTERNATIVE MEANS OF COPING WITH NATIONAL ENERGY EMERGENCIES

J. H. SORESENSEN 1981 9 p refs Presented at the 3rd Intern. Conf. on Energy Use Management, West Berlin, F. R., Germany, 26 Oct. 1981

(Contract W-7405-ENG-26)

(DE82-002812; CONF-811006-8) Avail: NTIS HC A02/MF A01

A comprehensive management framework is suggested for coping with largescale energy shortages. In doing so, events that may trigger a shortage are overviewed. A systems model of a shortage is discussed. Alternative management strategies are suggested and concepts of evaluating the strategies are briefly reviewed. The conclusion is made that national policies should emphasize a broad-based approach to coping with shortages with long term goals of preventing the events that cause emergencies. DOE

01 ENERGY POLICIES AND ENERGY SYSTEMS ANALYSIS

N83-15960# California Univ., Livermore. Lawrence Livermore Lab.

IDEAS FOR IMPLEMENTING AIR-QUALITY STUDIES IN THE WESTERN ROCKY MOUNTAIN REGION

M. H. DICKERSON Jul. 1982 16 p refs Presented at the 2nd Conf. on Oil Shale: The Environ. Challenges, Vail, Colo., 10-13 Aug. 1981

(Contract W-7405-ENG-48)

(DE82-000063; UCRL-86467; CONF-810838-2) Avail: NTIS HC A02/MF A01

To assess the impact of energy development in the western region of the Rocky Mountains, several space scales should be considered. The overall multistate region should be investigated from the view of baseline air quality and meteorology measurements. Results from a well designed and implemented baseline program would, in the future, be a valuable asset to answer critical questions about the air quality impact of energy development in this region. Modeling for an area this size (about 1000 km on a side) could wait until more reliable models are developed to address transport and diffusion on this scale in complex terrain. Also, studies on this scale require considerable resources and could be best handled by joint multiagency participation. For regions of approximately 200 km on a side, considerable research is presently underway by Federal agencies, universities, and private industry concerning atmospheric studies in complex terrain.

DOE

N83-16195# Oak Ridge National Lab., Tenn.

USDOE ACTIVITIES IN LOW-LEVEL RADIOACTIVE WASTE TREATMENT

J. E. VATH 1981 19 p Presented at the Seminar on the Management of Radioactive Waste from Nucl. Power Plants, Karlsruhe (West Germany), 5 Oct. 1981

(Contract W-7405-ENG-26)

(DE82-001450; IAEA-SR-57/42; CONF-811056-1) Avail: NTIS HC A02/MF A01

Current research, development and demonstration programs sponsored by the US Department of Energy in the area of low-level radioactive waste treatment are described. During the twelve month period ending September 30, 1981, 14 prime US Department of Energy contractors were involved with over 40 low-level radioactive waste disposal technology projects. Three specific projects or task areas were selected for discussion to illustrate new and evolving technologies, and application of technology developed in other waste management areas to low-level waste treatment. The areas to be discussed include a microwave plasma torch incinerator, application of waste vitrification, and decontamination of metal waste by melting.

DOE

N83-16256# King Research, Inc., Rockville, Md.

VALUE OF THE ENERGY DATA BASE

DOE 31 Mar. 1982 85 p refs Sponsored by DOE (DE82-014250) Avail: NTIS HC A05/MF A01

The Energy Information System is described. The value of the database is estimated.

N.W.

02

SOLAR ENERGY

Includes solar collectors, solar cells, solar heating and cooling systems, and solar generators.

A83-10100

ON THE SURFACE RADIATION BUDGET

R. T. PINKER (Maryland, University, College Park, MD) In: International Geoscience and Remote Sensing Symposium, Washington, DC, June 8-10, 1981, Digest Volume 2. New York, Institute of Electrical and Electronics Engineers, 1981, p. 1189-1194. refs

(Contract NOAA-NA-80AAD00048)

A study is being developed to evaluate the net gain or loss of radiant energy at the ground surface using data from satellite observations, which has relevance to problems related to regional climate trends, solar energy applications, and agriculture. Since information about these parameters is not available on a large scale, a methodology is being developed to infer these variables from satellite signatures. A model was developed which utilizes the high correlation that was found to exist between the net radiation and the total global solar radiation. In addition, an appropriate surface boundary layer model, compatible with the resolution of the satellite data, is being developed to compute sensible and latent heat fluxes. Preliminary results of experiments to compute the ground surface albedo for the Great Plains are presented and are found to be in good agreement with previously reported measurements.

N.B.

A83-10294

DIRECT-GAP GROUP IV SEMICONDUCTORS BASED ON TIN

C. H. L. GOODMAN (Standard Telecommunication Laboratories, Ltd., Harlow, Essex, England) IEE Proceedings, Part I - Solid-State Electron Devices, vol. 129, pt. 1, no. 5, Oct. 1982, p. 189-192. refs

The growth of thin films of tin with diamond structure of InSb and CdTe using molecular beam epitaxy under ultra high vacuum conditions is reported. It is determined that the photovoltaic behavior of the crystal suggests an energy gap of 0.12 eV, and the diamond structure of the tin layers is stabilized to about 70 C in contrast with 13 C for the bulk material. It is proposed that semiconductivity is a strain-induced splitting of the Groves-Paul degeneracy which has been taken to confer semimetallic behavior. An alternative, if less probable, explanation is also considered, in which the layer deposited by molecular beam epitaxy is free from Hg contamination and Hg could act as both donor (interstitial) and acceptor (substitutional), thus compensating to give quasi-gap-bridging impurity bands in an intrinsically semiconducting material. It is concluded that the band structure of the tin with diamond structure is of the G-P/B-B type, and that any energy gap is strain induced.

N.B.

A83-10428

SOLAR SATELLITES [SATELLITES SOLAIRES]

C. POHER (Centre National d'Etudes Spatiales, Paris, France) L'Aeronautique et l'Astronautique, no. 95, 1982, p. 13-20. In French.

A reference system design, projected costs, and the functional concepts of a satellite solar power system (SSPS) for converting sunlight falling on solar panels of a satellite in GEO to a multi-GW beam which could be received by a rectenna on earth are outlined. Electricity transmission by microwaves has been demonstrated, and a reference design system for supplying 5 GW dc to earth was devised. The system will use either monocrystalline Si or concentrator GaAs solar cells for energy collection in GEO. Development is still needed to improve the lifespan of the cells. Currently, the cell performance degrades 50 percent in efficiency after 7-8 yr in space. Each SSPS satellite would weigh either 34,000 tons (Si) or 51,000 tons (GaAs), thereby requiring the

fabrication of a heavy lift launch vehicle or a single-stage-to-orbit transport in order to minimize launch costs. Costs for the solar panels have been estimated at \$500/kW using the GaAs technology, with transport costs for materials to GEO being \$40/kg. M.S.K.

A83-10638

CW-LASER ANNEALED SOLAR CELLS

S. MATSUMOTO, J. F. GIBBONS, and F. C. WU (Stanford University, Stanford, CA) *Journal of Applied Physics*, vol. 53, Oct. 1982, p. 7020-7025. refs
(Contract NSF DMR-78-19970)

A technique combining ion implantation and CW-laser annealing has been applied to fabricate solar cells in single-crystal, metallurgical grade (MG) polycrystalline, and Wacker-cast polycrystalline silicon materials. CW-laser processing can produce solar cells with a high fill factor in all materials used. The best AM1 conversion efficiencies for MG Si and Wacker-cast Si cells were 10.3% and 10.5%, respectively, without an antireflecting coating. (Author)

A83-10699

ON THE FORMULA FOR THE UPPER LIMIT OF PHOTOVOLTAIC SOLAR ENERGY CONVERSION EFFICIENCY

A. DE VOS, C. C. GROSJEAN, and H. PAUWELS (Gent, Rijksuniversiteit, Ghent, Belgium) *Journal of Physics D - Applied Physics*, vol. 15, Oct. 14, 1982, p. 2003-2015. refs

The formula for the maximum efficiency of photovoltaic energy conversion in tandem solar cells is discussed. This formula is obtained by the use of a thermodynamically founded diode I-V characteristic, and is compared to a previously published formula which was based on the classical diode I-V characteristic within the framework of the theory of Shockley and Queisser. Series expansions of the complicated efficiency formula are presented. They enable an easy and accurate computation of the maximum efficiency and provide more insight in the basic limit of the photovoltaic effect. (Author)

A83-11007

MICROPROCESSOR CONTROL OF POWER SHARING AND SOLAR ARRAY PEAK POWER TRACKING FOR HIGH POWER /2.5 KW/ SWITCHING POWER CONVERTERS

J. H. SPEER, JR. (McDonnell Douglas Astronautics Co., Huntington Beach, CA) In: *PESC '81; Power Electronics Specialists Conference*, Boulder, CO, June 29-July 3, 1981, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 60-69.

A large deployable and recoverable solar array system and a series of high-efficiency power converters have been designed to supplement the power buses of the Shuttle Orbiter. Analog circuits are used for inner control loops and a microprocessor directs power sharing and peak power tracking. The tracking algorithm developed for the system permits operation right at the peak power point and actually searches continuously on both sides of this point without flattening the array. Hence, tracking of peak power can be accomplished through umbra and penumbra, through array degradation, temperature changes, and illumination changes due to array steering. In a prototype system, power sharing within 2% into the same load and an overall efficiency of 93.5% at 140 volt peak power point have been demonstrated. V.L.

A83-11510#

STATUS OF NEW THIN-FILM PHOTOVOLTAIC TECHNOLOGIES

K. W. MITCHELL (Solar Energy Research Institute, Golden, CO) In: *Annual review of materials science*. Volume 12. Palo Alto, CA, Annual Reviews, Inc., 1982, p. 401-415. refs

Some of the new thin film materials that show exceptional promise for photovoltaic applications are reviewed. These materials include copper indium diselenide, cadmium telluride, zinc phosphide, copper selenide, tungsten diselenide, and zinc silicon arsenide. The properties of the materials, the modes of deposition in thin films, and the photovoltaic parameters of thin film solar

cells made of the materials are discussed. CdS/CuInSe₂ and CdS/CdTe solar cells are shown in cross section. Other thin film solar cells are briefly described, including tungsten diselenide and ZnSiAs₂, a ternary chalcopyrite compound with near optimum bandgap. C.D.

A83-11696

DETERMINATION OF THE INTEGRAL CURRENTS OF SOLAR CELLS USING AN IMPROVED METHOD OF SPECTRAL SENSITIVITY MEASUREMENT [OPREDELENIE INTEGRAL'NYKH TOKOV SOLNECHNYKH ELEMENTOV S ISPOL'ZOVANIEM USOVERSHENSTVOVANNOI METODIKI IZMERENII SPEKTRAL'NOI CHUVSTVITEL'NOSTI]

T. M. GOLOVNER, M. M. KOLTUN, A. L. KOSTANENKO, and I. S. ORSHANSKII *Zhurnal Prikladnoi Spektroskopii*, vol. 37, Sept. 1982, p. 471-475. In Russian. refs

A method is proposed for determining the short-circuit current of a standard solar cell under extraatmospheric illumination conditions by using a device based on a diffraction monochromator. Short-circuit currents determined from measured absolute spectral characteristics are in good agreement with field calibrations based on extrapolation to zero atmospheric mass. The proposed method is recommended for calibrating standard solar cells with various spectral response characteristics. V.L.

A83-11764#

A STUDY OF SILICON AND GAAS SOLAR CELLS, AND THEIR OPTICAL COUPLING BY MEANS OF A DICHROIC MIRROR [ETUDE DES CELLULES SOLAIRES AU SILICIUM, AU GAAS, ET DE LEUR COUPLAGE OPTIQUE AU MOYEN D'UN MIROIR DICHROIQUE]

O. SOUMAORO *Toulouse III, Universite, Docteur (3e cycle) Thesis*, 1982. 115 p. In French refs

The results of theoretical and experimental work to increase the efficiency of Si and GaAs solar cell concentrator assemblies by optical coupling with a dichroic mirror are presented. It is noted that the energy losses due to selective bandwidth in Si cells is near 23 percent, and thermal losses account for another 33 percent. The mechanisms which cause decreased efficiencies in solar cells are summarized and techniques for increasing the efficiency are reviewed. A numerical model is developed for the functioning of Si and GaAs solar cells in tandem operation. A device was fabricated using a Fresnel lens to concentrate sunlight into a rectangular channel cut diagonally front-to-back by a dichroic mirror. The back of the channel carried a Si cell, while the side was a GaAs cell. Cooling fins dispersed the thermal energy out the back of the channel. The Si cell displayed an 11 percent efficiency in the assembly, while the GaAs cell performed at 17 percent. M.S.K.

A83-11766#

REFLECTIONS ON SOLAR COLLECTORS AT ELEVATED TEMPERATURES /260-1000 C/ [REFLEXIONS SUR LES COLLECTEURS SOLAIRES A TEMPERATURES ELEVEES /260-1000 C/]

B. AUTHIER *Aix-Marseille III, Universite, Docteur-es-Sciences Thesis*, 1982, p. 1-42, 51-55, 63-69, 86-99, 107-112, 122-144, 150-175. In French and English. refs

Analytical models are developed for optical efficiencies and requirements of concentrating solar collectors, taking into account factors which affect the potentials for mass production. Reflective polyester films and a process to form large spherical mirrors from glass sheets have been crucial factors for lowering production costs. Microprocessors permit the nearly fully automated operation of parabolic dish point-focus and heliostat-central tower solar power plants, leaving only monitoring and maintenance for personnel. The use of GaAs-AsAl solar cells at the point focus of large spherical concentrators in the PERICLES project has yielded 22 percent energy conversion efficiencies, although problems of cooling the cells have yet to be solved. Applications of the PERICLES concept for Indian village power supplies at 10 kWe/unit, while simultaneously supplying a drain hole at the center as a rainwater collection device, is described. M.S.K.

02 SOLAR ENERGY

A83-11768#

A METHODOLOGY OF EVALUATION AND DESIGN OF FIELDS OF FOCUSING HELIOSTATS [METHODOLOGIE D'EVALUATION ET DE CONCEPTION DE CHAMPS D'HELIOSTATS FOCALISANTS]

J.-C. HENNET Toulouse III, Université, Docteur d'Etat Thesis, 1982. 189 p. In French. refs

Numerical models for the representation of a field of focusing heliostats, for performance optimization, and for computer-aided design of heliostat fields are presented. A simplified global analysis is used, together with the physical properties of concentrated solar energy. Attention is given to design constraints caused by physics and economics, the efficiency, and the availability of the system. Precise quantification of the solar flux produced by the heliostat field is undertaken, regarding each reflected ray as a primary component surrounded by a conic envelope. Approximations are formulated for the effects of shade and blockage between the heliostats. A performance matrix is devised to predict annual output based on a branch and bound method. Finally, optimization is described in terms of a triangular-block structure and the performance matrix as bases for a parametric analysis. M.S.K.

A83-11802

SOLAR THERMAL ELECTRICITY GENERATION - EURELIOS, THE 1 MW/EL/ HELIOELECTRIC POWER PLANT OF THE EUROPEAN COMMUNITIES

J. GRETZ (Commission of the European Communities, Joint Research Centre, Ispra, Italy) International Journal of Solar Energy, vol. 1, July 1982, p. 3-19. refs

A83-11803

RECENT PROGRESS OF AMORPHOUS-SILICON SOLAR-CELL TECHNOLOGY IN JAPAN

Y. HAMAKAWA (Osaka University, Toyonaka, Japan) International Journal of Solar Energy, vol. 1, July 1982, p. 33-53. refs

A review is given of the current state of the art in Japanese domestic activities in amorphous silicon solar-cell R and D. The historical background and the present status of amorphous silicon solar-cell research in Japan are overviewed. Some new approaches and key technologies to improve solar-cell performance with new amorphous materials such as a SiC:H, micro-c-Si:H, a-SiGe:H and heterojunction solar cells constructed of these materials are introduced. Progress of the conversion efficiency in various types of amorphous-silicon solar-cells is surveyed and discussed. Recent features of the industrialization of a-Si photovoltaic cells in Japan are also reviewed, and future prospects are indicated. (Author)

A83-11811

EXACTLY SOLUBLE MODEL FOR A SOLAR CELL WITH NONLINEAR RECOMBINATION

M. CINI (Laborator Tecnologie di Fisica Applicata, Rome, Italy) and G. FORTUNATO (Roma, Università, Rome, Italy) Applied Physics Communications, vol. 1, no. 2, 1981-1982, p. 149-161. refs

A model is developed for obtaining an analytical solution of the nonlinear boundary problem for the current-voltage characteristics of a photovoltaic junction when the carrier recombination is taken to occur at localized centers. By choosing three centers in the different zones, a spatially uniform recombination process can be simulated. Different choices of the recombination centers are examined and their effect on the current-voltage characteristics is evaluated in dark and light exposed conditions. It is found that by using three discrete centers results are obtained that agree very closely with those of the continuous model. N.B.

A83-11848

DETERMINATION OF THE INTERFERENCE BETWEEN THE ELEMENTS OF A CENTRAL-RECEIVER SOLAR SYSTEM

U. FACCHINI, G. SASSI (Milano, Università, Milan, Italy), F. PARRINI (Ente Nazionale per l'Energia Elettrica, Centro Ricerche Termiche Nucleari, Milan, Italy), and A. LONGHETTO (Torino, Università; CNR, Istituto di Cosmogeo-fisica, Turin, Italy) Nuovo Cimento C, Serie 1, vol. 5C, Jan.-Feb. 1982, p. 84-98. Research supported by the Ente Nazionale per l'Energia Elettrica and Università di Milano.

This work deals with the problem of determining the shadow and blocking effects between the rectangular heliostats of a central-receiver system for the utilization of solar energy. The type of approach followed is the McFee approach, suitably generalized. Indications are also given regarding the calculation of the density of radiation collected on a receiver assumed to be flat. (Author)

A83-11849

MATHEMATICAL MODEL FOR A NONITERATIVE OPTIMIZATION OF EACH SYSTEM FOR EXPLOITING SOLAR ENERGY

G. SASSI (Milano, Università, Milan, Italy) Nuovo Cimento C, Serie 1, vol. 5C, Jan.-Feb. 1982, p. 99-111. Research sponsored by Snamprogetti S.p.A. and Ente Nazionale Idrocarburi. refs

In order to improve the solar-energy collection, whatever the adopted system may be, it is necessary to make ready a mathematical model which matches the astronomical co-ordinates and the geometric ones on the ground in a sole optimization process. The model here proposed permits such a determination in an analytical way, without utilizing iterative numerical methods, as done till now. The proposed approach to the problem is carried out by using the solid analytic geometry. This means that the required mathematical development is quite brief; it refers to a central-receiver system so as to make it as general as possible, but it is immediately adaptable to any other system of exploiting solar energy. (Author)

A83-11991

THEORETICAL TEMPERATURE DEPENDENCE OF SHORT-CIRCUIT CURRENT OF DRIFT-FIELD SOLAR CELLS

K. CHIDA and S. MURAMATSU (Utsunomiya University, Utsunomiya, Japan) Solid-State Electronics, vol. 25, Oct. 1982, p. 1055, 1056. refs

A83-12029

RESEARCH ON THE CHARACTERISTIC PARAMETERS OF THERMOPHOTOVOLTAIC /TPV/ CONVERTER PERFORMANCE

M. AGNELLO, G. CASTAGNO, F. DEMICHELIS, E. MINETTI-MEZZETTI, and E. TRESSO (Torino, Politecnico, Turin, Italy) Nuovo Cimento B, Serie 11, vol. 71 B, Sept. 11, 1982, p. 89-97. refs

The characteristic parameters and the problems involved in the realization of a thermophotovoltaic (TPV) converter have been investigated. Emitters of pure polycrystalline graphite appear the most convenient, since their emittance is high and they are easy to prepare. Measurements of the practical efficiency of cells under TPV conditions have been made. (Author)

A83-12059

PROCESS FOR HIGH PHOTOCURRENT IN IBC SOLAR CELLS

F. W. SEXTON, C. M. GARNER, and J. L. RODRIGUEZ (Sandia National Laboratory, Albuquerque, NM) Electrochemical Society, Journal, vol. 129, Nov. 1982, p. 2624-2628. Research supported by the U.S. Department of Energy. refs

An interdigitated back contact solar cell fabrication process that yields cells with current-collection efficiencies in excess of 90% in n-type silicon is presented. This process maintains high bulk minority-carrier lifetime through the use of diffusion gettering steps and relatively low processing temperatures. Low front and back surface recombination velocities are achieved by growing thermal oxides on these surfaces followed by a forming gas anneal. Bulk lifetimes on the order of 350 microsec and front surface

recombination velocities of less than 30 cm/sec are determined by comparing measured quantum efficiency data to calculated quantum efficiency using an analytical code which solves the transport equations in one dimension. These lifetimes are compared to values of 290-190 microsec measured for cells with and without a front surface n(+) layer, respectively. These were measured with a laser scanning technique using the 514 nm wavelength and are considered a lower limit to the lifetimes. (Author)

A83-12287**MEANING OF THE PHOTOVOLTAIC BAND GAP FOR AMORPHOUS SEMICONDUCTORS**

E. YABLONOVITCH, T. TIEDJE, and H. WITZKE (Exxon Corporate Research Laboratory, Linden, NJ) *Applied Physics Letters*, vol. 41, Nov. 15, 1982, p. 953-955. refs

The concept of a photovoltaic band gap for amorphous solar cells is introduced. This is the minimum photon energy thermodynamically required for the generation, of two free carriers in an operating solar cell. For hydrogenated amorphous silicon the photovoltaic band gap is 1.57 eV at one sun illumination.

(Author)

A83-12290**SELF-ANNEALED ION IMPLANTED SOLAR CELLS**

E. GABILLI, R. LOTTI, P. G. MERLI, R. NIPOTI, and P. OSTOJA (CNR, Istituto LAMEL, Bologna, Italy) *Applied Physics Letters*, vol. 41, Nov. 15, 1982, p. 967, 968. refs

First results for self-annealing implantation with dopant ions in the fabrication of solar cells are reported. The irradiations were performed using two different incidence angles. The power densities and exposure times for the two cases are given. For the complete solar cells, carrier concentration and mobility profiles for the two implantation conditions are shown. The observed enhanced scattering effect, structural analysis, and transmission electron microscope observations show a high level of defects which affects the performance of the cells. The different implantation processes do not produce differences in the bulk lifetime values. The nonoptimized profile shape causes a low surface carrier concentration, affecting the front contact resistance of the cells, and also helps reduce performance. The characteristics of the implanted layer and basic cell performance for each irradiation condition are shown.

C.D.

A83-12321**PROPERTIES OF AMORPHOUS SILICON SOLAR CELLS**

R. D. PLAETTNER, W. W. KRUEHLER, and M. MOELLER (Siemens AG, Forschungslaboratorien, Munich, West Germany) *Siemens Forschungs- und Entwicklungsberichte*, vol. 11, no. 5, 1982, p. 284-289. Research supported by the Bundesministerium fuer Forschung und Technologie. refs

Solar cells which are employed as power supplies for electrical systems and equipment must operate with high efficiency, remain mechanically and electrooptically stable over many years, and be reasonably priced. Thin-film solar cells consisting of hydrogenated amorphous silicon show great promise with respect to satisfying these requirements. In comparison to current cells made of bulk crystalline silicon, the fabrication of amorphous thin-film cells leads to a reduction in material consumption by a factor of 1000. A cost of about 1 DM per watt peak power for cells intended for exposure to optimum solar illumination is predicted. The main problem regarding solar cells of the considered design is related to a limitation in efficiency in connection with the high density of defect states in the amorphous material. However, the development of a procedure involving the use of hydrogen has made it possible to reduce this density.

G.R.

A83-12475* # TRW, Inc., Redondo Beach, Calif

OPTIMAL SUN-ALIGNMENT TECHNIQUES OF LARGE SOLAR ARRAYS IN ELECTRIC PROPULSION SPACECRAFT

H. F. MEISSINGER, C. L. DAILEY (TRW, Inc., Space and Technology Group, Redondo Beach, CA), and M. E. VALGORA (NASA, Lewis Research Center, Cleveland, OH) *AIAA, Japan Society for Aeronautical and Space Sciences, and DGLR, International Electric Propulsion Conference, 16th, New Orleans, LA, Nov. 17-19, 1982, AIAA 13 p refs*

(Contract NAS3-22661)

(AIAA PAPER 82-1898)

Optimum sun-alignment of large solar arrays in electric propulsion spacecraft operating in earth orbit requires periodic roll motions around the thrust axis, synchronized with the apparent conical motion of the sun line. This oscillation is sustained effectively with the aid of gravity gradient torques while only a small share of the total torque is being contributed by the attitude control system. Tuning the system for resonance requires an appropriate choice of moment-of-inertia characteristics. To minimize atmospheric drag at low orbital altitudes the solar array is oriented parallel, or nearly parallel, to the flight direction. This can increase the thrust-to-drag ratio by as much as an order of magnitude. Coupled with optimal roll orientation, this feathering technique will permit use of electric propulsion effectively at low altitudes in support of space shuttle or space station activities and in spiral ascent missions.

(Author)

A83-12596**OPTICAL ANALYSIS OF SOLAR ENERGY TUBULAR ABSORBERS**

C. SALTIEL and M. SOKOLOV (Tel Aviv University, Tel Aviv, Israel) *Applied Optics*, vol. 21, Nov. 15, 1982, p. 4033-4039. refs

The energy absorbed by a solar energy tubular receiver element for a single incident ray is derived. Two types of receiver elements were analyzed: (1) an inner tube with an absorbing coating surrounded by a semi-transparent cover tube, and (2) a semitransparent inner tube filled with an absorbing fluid surrounded by a semitransparent cover tube. The formation of ray cascades in the semitransparent tubes is considered. A numerical simulation to investigate the influence of the angle of incidence, sizing, thickness, and coefficient of extinction of the tubes was performed. A comparison was made between receiver elements with and without cover tubes. Ray tracing analyses in which rays were followed within the tubular receiver element as well as throughout the rest of the collector were performed for parabolic and circular trough concentrating collectors.

(Author)

A83-12791* # Jet Propulsion Lab., California Inst. of Tech., Pasadena.

THERMAL RESPONSE OF SOLAR RECEIVER APERTURE PLATES DURING SUN WALK-OFF

L. WEN and J. ROSCHKE (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA) *American Institute of Aeronautics and Astronautics and American Society of Mechanical Engineers, Joint Thermophysics, Fluids, Plasma and Heat Transfer Conference, 3rd, St. Louis, MO, June 7-11, 1982, ASME 11 p. Research supported by the U.S. Department of Energy. refs* (ASME PAPER 82-HT-33) MEMBERS, \$2.00; NONMEMBERS, \$4.00

The tracking mechanism for a point-focusing concentrator may be subject to failure. If this should occur, the solar image will travel across the aperture plate, and it may also impinge on the adjacent support structure. Such an event is called 'sun walk-off'. The present investigation is concerned with the transient response of different aperture plate materials to the intense heating produced in a typical walk-off situation for parabolic dish concentrators. Receivers for two solar module systems are considered, including a high-temperature receiver that utilizes a 2-milliradian (mrad) concentrator, and a lower-temperature receiver which is coupled with a 4-mrad concentrator. It is found that during a walk-off situation the solar image travels in a straight line in the radial direction. The results obtained for a copper aperture plate were

02 SOLAR ENERGY

disappointing. It appears that passive metallic plates without cooling or other protective support cannot withstand the intense heating
G.R.

A83-12799#

THERMAL STORAGE PERFORMANCE CALCULATIONS BY CLOSED FORM AND FINITE DIFFERENCE SOLUTIONS

M. E. TALAAT and E. COLUCCI (Maryland, University, College Park, MD) American Institute of Aeronautics and Astronautics and American Society of Mechanical Engineers, Joint Thermophysics, Fluids, Plasma and Heat Transfer Conference, 3rd, St. Louis, MO, June 7-11, 1982, ASME 10 p.
(ASME PAPER 82-HT-52) MEMBERS, \$2.00, NONMEMBERS, \$4.00

It is shown that very close results are obtained when performance calculations are made for a liquid solar-thermal energy storage concept for continuous operation of an energy conversion system, either by using closed form solutions of the differential energy equation, or by using a computerized numerical solution based on a finite difference approximation of the differential energy equation, with each operating step subdivided into smaller increments. Typical deviation in storage temperatures calculated by the two methods at any given time is less than about 1.3 C, and the deviation in a typical thermal power load of 3600 W is less than about 5 W. It is also shown that the performance improves for larger storage systems. Output energy densities of about 77-85 kW-hr/cu m and solar collection-storage efficiencies of 42 to 46% are obtained with pressurized water and parabolic cylindrical collectors.
(Author)

A83-12800#

AN EXPERIMENTAL STUDY OF SINGLE MEDIUM THERMOCLINE THERMAL ENERGY STORAGE

R. J. GROSS (Sandia National Laboratory, Albuquerque, NM) American Institute of Aeronautics and Astronautics and American Society of Mechanical Engineers, Joint Thermophysics, Fluids, Plasma and Heat Transfer Conference, 3rd, St. Louis, MO, June 7-11, 1982, ASME 8 p. refs
(Contract DE-AC04-76DP-00789)
(ASME PAPER 82-HT-53) MEMBERS, \$2.00, NONMEMBERS, \$4.00

Experiments were conducted on a 4.54 cu m single medium thermocline facility to determine the feasibility of the thermocline thermal energy storage concept on a large scale and to determine the relative importance of each of the five heat loss mechanisms present in such a system. The results of heat loss tests, static thermocline cool down tests and charge/discharge tests are presented. A simple one-dimensional model is proposed for the prediction of the temperature field during a cool down test in which a thermocline is present. The model agrees well with experiment.
(Author)

A83-12951

GLOBAL SOLAR RADIATION ESTIMATION FROM RELATIVE SUNSHINE HOURS IN ITALY

A. ANDRETTA, B. BARTOLI, B. COLUZZI, V. CUOMO, M. FRANCESCA, and C. SERIO (Napoli, Università, Naples, Italy) Journal of Applied Meteorology, vol. 21, Oct. 1982, p. 1377-1384. refs

Available data on the global solar radiation are examined with respect to the insolation for Italy in order to evaluate errors in estimating the total radiation from the number of hours when the sun shines. The global data was gathered at 28 meteorological stations using pyranometers, while sunshine duration was assayed with heliographs. The global data was treated as monthly averages of global solar radiation on a horizontal surface and sunshine hours averaged over the period 1958-69. Additional sunshine duration measurements were taken at 70 other stations in Italy. A correlation of 0.796 was determined by linear regression between the ratios of available radiation outside the atmosphere and that available at the surface to the total number of sunshine hours divided by the total hours of measurement. A relation was

formulated for estimations of the global radiation independent of season.
M.S.K

A83-13473#

THE INFLUENCE OF THE INTERFACE STATE ON THE PROPERTIES OF SOLAR CELL SEMICONDUCTOR ELECTRODES

Z.-D. LIN, P.-Z. ZHOU, Y.-Q. CHEN, H.-G. DENG, S.-X. QI, C.-H. WANG, and K. XIE (Chinese Academy of Sciences, Physics Institute, Beijing, People's Republic of China) Acta Physica Sinica, vol. 31, Sept. 1982, p. 1198-1205. In Chinese, with abstract in English. refs

The influence of interface state on electrode properties is studied for the case of an n-Fe₂O₃ film on an n-Si substrate which has undergone surface treatment to form a double layer semiconductor electrode. Photoluminescence measurements show that an interface state with a high density of states lies above the 1.61-eV Fe₂O₃ valence band. The Fermi level is pinned by this interface state. Energy band profiles are used to explain the photoluminescence, in addition to theoretical calculation and analysis for the capacity-voltage and photocurrent-voltage curves. These curves are found to agree with experimental data. The present double layer semiconductor electrode is seen as a promising material for stable solar cells exhibiting high conversion efficiency.
O.C.

A83-13476*# AiResearch Mfg. Co., Torrance, Calif.

HIGH-TEMPERATURE CERAMIC HEAT EXCHANGER ELEMENT FOR A SOLAR THERMAL RECEIVER

H. J. STRUMPF, D. M. KOTCHICK, and M. G. COOMBS (AiResearch Manufacturing Co., Torrance, CA) ASME, Transactions, Journal of Solar Energy Engineering, vol. 104, Nov. 1982, p. 305-309
(Contract NAS7-100; JPL-955875)

A study has been completed on the development of a high-temperature ceramic heat exchanger element to be integrated into a solar receiver producing heated air. A number of conceptual designs were developed for heat exchanger elements of differing configuration. These were evaluated with respect to thermal performance, pressure drop, structural integrity, and fabricability. The final design selection identified a finned ceramic shell as the most favorable concept. The ceramic shell is surrounded by a larger metallic shell. The flanges of the two shells are sealed to provide a leak-tight pressure vessel. The ceramic shell is fabricated by an innovative combination of slip casting the receiver walls and precision casting the heat transfer finned plates. The fins are bonded to the shell during firing. Fabrication of a one-half scale demonstrator ceramic receiver has been completed.
(Author)

A83-13477#

INTEGRATED SOLAR ENERGY SYSTEM OPTIMIZATION

S. K. YOUNG (Science Applications, Inc., McLean, VA) ASME, Transactions, Journal of Solar Energy Engineering, vol. 104, Nov. 1982, p. 310-316. refs

The computer program SYSOPT, intended as a tool for optimizing the subsystem sizing, performance, and economics of integrated wind and solar energy systems, is presented. The modular structure of the methodology additionally allows simulations when the solar subsystems are combined with conventional technologies, e.g., a utility grid. Hourly energy/mass flow balances are computed for interconnection points, yielding optimized sizing and time-dependent operation of various subsystems. The program requires meteorological data, such as insolation, diurnal and seasonal variations, and wind speed at the hub height of a wind turbine, all of which can be taken from simulations like the TRNSYS program. Examples are provided for optimization of a solar-powered (wind turbine and parabolic trough-Rankine generator) desalination plant, and a design analysis for a solar powered greenhouse.
M.S.K.

A83-13478#

TRANSIENT PERFORMANCE OF EVACUATED TUBULAR SOLAR COLLECTORS

M. J. BEHRENDORFF and R. I. TANNER (Sydney, University, Sydney, Australia) ASME, Transactions, Journal of Solar Energy Engineering, vol. 104, Nov. 1982, p. 326-332. refs

A computer program using a finite difference technique is developed to study the steady-state and transient performance of an evacuated solar collector suitable for applications in the 120 - 250 C temperature region. The collector is modeled as an equivalent flat plate collector, with water, oil, and air being the heat transfer fluids studied in detail. Nonflow and laminar flow conditions are considered for the three fluids, together with turbulent flow for air. Step and sinusoidal solar inputs are modeled. Experimental transient tests on a module of evacuated collectors were made and were used to show that the accuracy of the theoretical model developed is adequate for design purposes

(Author)

A83-13479#

AN EXPERIMENTAL INVESTIGATION OF A STATIONARY REFLECTOR/TRACKING ABSORBER SOLAR COLLECTOR AT INTERMEDIATE TEMPERATURES

E. FRUCHTER (Technion - Israel Institute of Technology, Haifa, Israel), F. KREITH (Solar Energy Research Institute, Golden, CO), and G. GROSSMAN ASME, Transactions, Journal of Solar Energy Engineering, vol. 104, Nov. 1982, p. 340-344. Research sponsored by the U.S.-Israel Binational Science Foundation, and Ministry of Energy and Infrastructure of Israel refs
(Contract W-7405-ENG-26)

This paper describes the design, construction, and testing of a concentrating solar collector based on the Stationary Reflector/Tracking Absorber (SRTA) principle. The system consists of a fixed, 2.5-m diameter spherical mirror which focuses solar radiation on a movable, cylindrical absorber tracking the sun. This work is an extension of earlier tests with a similar collector in which output temperatures up to 150 C were obtained with water. The present system, using a mineral oil-based heat transfer fluid, was capable of heating the fluid up to 300 C under steady state conditions. The direct radiation efficiency ranged from 50% at low temperatures up to 30% near 300 C, showing the SRTA to be an effective concentrating collector for the intermediate temperature range which can be constructed at relatively low cost. (Author)

A83-13480#

INCIDENT ANGLE MODIFIERS FOR FLAT-PLATE SOLAR COLLECTORS - ANALYSIS OF MEASUREMENT AND CALCULATION PROCEDURES

W. C. THOMAS, A G DAWSON, III (Virginia Polytechnic Institute and State University, Blacksburg, VA), D. WAKSMAN, and E R. STREED (National Bureau of Standards, Center for Building Technology, Washington, DC) ASME, Transactions, Journal of Solar Energy Engineering, vol. 104, Nov. 1982, p. 349-357. Research supported by the U.S. Department of Energy. refs

An investigation of the measuring procedures used to establish the angular response of four different types of solar flat-plate collectors is presented. The measurements indicated that substantial differences exist in accuracy and techniques among different laboratories. It was found that the collectors were sometimes measured at non-normal incidence angles, which caused uncertainties the same order of magnitude as efficiency reductions due to non-normal incidence angles. Additional uncertainty was introduced by the shading of the absorber by the end- and side-walls, producing decreases in absorptance of the same order of magnitude as decreases in transmissivity due to the cover assembly. A simple analytical model is developed to account for the off-normal incidence angles. A total effect of 5% is calculated for the incidence angle modifiers. M.S.K.

A83-13481#

ANALYSIS OF TWO-PHASE FLOW SOLAR COLLECTORS WITH APPLICATION TO HEAT PUMPS

S. K. CHATURVEDI, Y. F. CHIANG, and A. S. ROBERTS, JR. (Old Dominion University, Norfolk, VA) ASME, Transactions, Journal of Solar Energy Engineering, vol. 104, Nov. 1982, p. 358-365. refs

A thermodynamic model is developed to analyze the thermal performance of two-phase solar collectors. The well-known equilibrium homogeneous theory is used to model the two-phase flow in the solar collectors. The resultant set of coupled ordinary differential equations for saturated pressure and quality of working fluid in the collector tubes are solved by an iterative procedure using a fourth-order Runge-Kutta method. The results are then applied to determine the thermal performance of a solar assisted heat pump which uses two-phase flow collectors as the evaporator. The results indicate that even with the use of less expensive bare solar collectors as evaporator for the heat pump, the heating coefficient of performance (COP(H)) as high as 6 can be obtained under realistic ambient conditions provided a proper matching exists between the collector's evaporative capacity and the compressor's pumping capacity. (Author)

A83-13482*# Old Dominion Univ., Norfolk, Va.

HYBRID THERMOELECTRIC SOLAR COLLECTOR DESIGN AND ANALYSIS

A. S. ROBERTS, JR. (Old Dominion University, Norfolk, VA) and K. E. SHAHEEN ASME, Transactions, Journal of Solar Energy Engineering, vol. 104, Nov. 1982, p. 373-377. NASA-supported research. refs

A flat-plate solar collector is conceived where energy cascades through thermoelectric power modules generating direct-current electricity. The intent of this work was to choose a collector configuration and to perform a steady-state thermal performance assessment. A set of energy balance equations were written and solved numerically for the purpose of optimizing collector thermal and electrical performance. The collector design involves finned columns of thermoelectric modules imbedded in the absorber plate (hot junction) over a parallel array of vertical tubes. The thermoelectric power output is limited by the small hot-junction/cold-junction temperature difference which can be maintained under steady-state conditions. The electric power per unit tube pass area is found to have a maximum as a function of a geometric parameter, while electric power is maximized with respect to an electric resistance ratio. Although the electric power efficiency is small, results indicate that there is sufficient electric power production to drive a coolant circulator, suggesting the potential for a stand-alone system. (Author)

A83-13501

SOLAR CELL DEVICE PHYSICS

S. J. FONASH (Pennsylvania State University, University Park, PA) New York, Academic Press, 1981. 348 p. refs
\$35

A qualitative and quantitative exploration of the physical principles and operating characteristics of photovoltaic cells is presented. Solar cells experience a light-induced transition from a ground to an excited state, possess a transport mechanism to carry away the excited electrons or holes, and have properties which prevent the backward flow of electrons and holes. Attention is given to the electronic and optical properties of crystalline, polycrystalline, and amorphous solar cells, made from either organic or inorganic materials. The process of generation, recombination, and bulk transport are considered, together with the origins of photovoltaic activity in materials. Drift and diffusion, the two mechanisms for photocarrier collection in photovoltaics, are compared. Homojunctions, semiconductor-semiconductor heterojunctions, and surface-barrier devices are defined and quantitatively analyzed. Specific device configurations and experimental results are presented for each solar cell type described. M.S.K.

02 SOLAR ENERGY

A83-13580* Jet Propulsion Lab., California Inst. of Tech., Pasadena.

CALIBRATION OF SOLAR CELLS BY THE REFERENCE CELL METHOD - THE SPECTRAL MISMATCH PROBLEM

C. H. SEAMAN (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA) Solar Energy, vol. 29, no. 4, 1982, p. 291-298. Research sponsored by the U.S. Department of Energy and NASA. refs

The calibration of solar cells by means of solar simulators and calibrated reference cells has always been faced with the problem of errors due to source spectral irradiance mismatch and cell spectral response mismatch. A general expression is derived in this paper to enable calculation of mismatch error. The information required to make this calculation is the relative spectra responses of the test and reference cells, and the relative spectral irradiance of the simulator (over the spectral range defined by cell response). The spectral irradiance of the solar standard is assumed given. Experimental results are presented. (Author)

A83-13581

LUMINESCENT SOLAR CONCENTRATORS - A REVIEW

A. M. HERMANN (Solar Energy Research Institute, Golden, CO) Solar Energy, vol. 29, no. 4, 1982, p. 323-329 refs

Theoretical and cost considerations for the fabrication of luminescent solar concentrators (LSC) are discussed, along with the progress of research on the devices. The working principle consists of transparent material impregnated with randomly dispersed dye molecules which absorb photons at one wavelength and reemit them at longer wavelengths. Since the dyes are inside laminated plates, selectively reflective inner surfaces trap the reemitted light and eventually deposit it on solar cells mounted on the ends of the transparent plates. The maximum efficiency of an LSC plate coupled to Si solar cells is calculated to be 20%, and large array costs in 1986 have been projected to be on the order of \$2.37/peak watt. AM1 efficiencies have been achieved with Coumarin 6 and Rhodamine 101 dyes. Efforts are proceeding to eliminate photodegradation in the dyes using inorganic chemicals. M.S.K.

A83-13582

COLLECTION OF SOLAR ENERGY AT SPECIFIED OUTPUT TEMPERATURE

H. S. ROBERTSON (Miami, University, Coral Gables, FL) and R. P. PATERA (Evansville, University, Evansville, IN) Solar Energy, vol. 29, no. 4, 1982, p. 331-337. refs

A theoretical examination of adjustment of the mass flow rate in a pumped-fluid solar collector to achieve a desired output temperature is presented. It is shown that there is no significant advantage to multiple passes through the collector to perform staged heating on the fluid. Consideration is also given to single-pass heating when the irradiance changes between passes, to series heating under changing irradiance, and one pass through two collectors. The analysis is based on use of the Hottel-Whillier equations. It is found that a mass flow rate is best chosen when the required fluid heating is accomplished in a single pass. The mass flow rate should be as rapid as practicable, with the fluid channels being small enough to ensure that the heating penetrates to the core of the fluid passing through the collector. M.S.K.

A83-13583

A DESIGN METHOD FOR CLOSED LOOP SOLAR ENERGY SYSTEMS WITH CONCENTRATING COLLECTORS

W. A. RYAN (Affiliated Engineers, Inc., Madison, WI) Solar Energy, vol. 29, no. 4, 1982, p. 355-357 (Contract E(11-1)-2588)

A method of performance prediction and design for closed loop concentrating solar collector systems is presented, along with a comparison of prediction with results using a compound parabolic concentrating collector. The numerical model is an extension of Collares-Pereira and Rabl (1978) model for concentrating collectors to a closed-loop scenario, using a monthly average utilizability factor and the f-chart technique. The predictions were compared with simulations using the TRNSYS program, considering 1.5, 3.0,

and 5.0 concentration factors, and a sensible heat storage system. Performance predictions were found to depart from the simulations by an average of 14.04% for all cases, with the predictions giving consistently lower results. The method is concluded to be useful for optimizing collector areas and concentration ratios in closed-loop systems. M.S.K.

A83-13647

PERFORMANCE CHARACTERISTICS OF 350 KW PHOTOVOLTAIC POWER SYSTEM FOR SAUDI ARABIAN VILLAGES

B. H. KHOSHAIM (Saudi Arabian National Center for Science and Technology, Riyadh, Saudi Arabia) International Journal of Solar Energy, vol. 1, no. 2, 1982, p. 91-103.

The program goals, design features, and preliminary performance data for a 350 kW concentrator solar cell array for powering a village in Saudi Arabia are outlined. Main design features include passive array cooling, tolerance of sandstorms and 40 kt winds, cleaning with a water jet, inverter output of 277/480 Vac, 3-phase current, stand alone operation, modular construction, minimum maintenance, and a lifetime of 20 yr. The photovoltaic array subsystem comprises 160 pedestal concentrator arrays with each array consisting of 256 2.25-in diam solar cells exposed to light transmitted through Fresnel lenses at a concentration of 33 suns. Details of the structure and tracking mechanisms are provided. A battery subsystem serves as a power source in the night, and is able to supply 1100 kWh down to 75% discharge. Back-up power is furnished by four 250 kVA diesel generators. The system has thus far displayed an overall efficiency of 11.91%, in line with design goals. M.S.K.

A83-13648* Jet Propulsion Lab., California Inst. of Tech., Pasadena

POLYCRYSTALLINE SILICON AVAILABILITY FOR PHOTOVOLTAIC AND SEMICONDUCTOR INDUSTRIES

R. R. FERBER, E. N. COSTOGUE (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA), and R. PELLIN International Journal of Solar Energy, vol. 1, no. 2, 1982, p. 105-124. Research sponsored by the U.S. Department of Energy and NASA.

Markets, applications, and production techniques for Siemens process-produced polycrystalline silicon are surveyed. It is noted that as of 1982 a total of six Si materials suppliers were servicing a worldwide total of over 1000 manufacturers of Si-based devices. Besides solar cells, the Si wafers are employed for thyristors, rectifiers, bipolar power transistors, and discrete components for control systems. An estimated 3890 metric tons of semiconductor-grade polycrystalline Si will be used in 1982, and 6200 metric tons by 1985. Although the amount is expected to nearly triple between 1982-89, research is being carried out on the formation of thin films and ribbons for solar cells, thereby eliminating the waste produced in slicing Czochralski-grown crystals. The free-world Si production in 1982 is estimated to be 3050 metric tons. Various new technologies for the formation of polycrystalline Si at lower costs and with less waste are considered. New entries into the industrial Si formation field are projected to produce a 2000 metric ton excess by 1988. M.S.K.

A83-13649

VALENCY CONTROL OF GLOW DISCHARGE PRODUCED A-SiC:H AND ITS APPLICATION TO HETEROJUNCTION SOLAR CELLS

Y. HAMAKAWA and Y. TAWADA (Osaka University, Toyonaka, Japan) International Journal of Solar Energy, vol. 1, no. 2, 1982, p. 125-144. Research sponsored by the Ministry of Education and Ministry of International Trade and Industry. refs

A new type of amorphous silicon solar cell having a conversion efficiency of 8% level is introduced. The cell has a wide band gap window layer made of hydrogenated amorphous silicon carbide, (a-SiC:H), with a good valency control. Electrical, optical and optoelectronic properties of a-SiC:H have been investigated, together with their valency controllability. A design concept and some key technologies to improve solar cell performance with

this new material are demonstrated. A series of technical data on material preparation and cell performance are presented. Clear improvements in cell performance, not only I sub SC but also V sub OC, have been obtained. The realistic limit of the conversion efficiency in a-Si solar cells is estimated and discussed. (Author)

A83-13677**REVIEW - SOLAR-GRADE SILICON**

B. R. BATHEY and M. C. CRETTELLA (Mobil Tyco Solar Energy Corp., Waltham, MA) *Journal of Materials Science*, vol. 17, Nov. 1982, p. 3077-3096. refs

Various methods of manufacturing low-cost solar-grade silicon are reviewed. The methods include refining metallurgical-grade silicon, reduction of silicon compounds by metals and nonmetals, transport and thermal decomposition processes. The materials are briefly characterized by the chemical analysis, resistivity measurements and efficiency of solar cells obtained from them. (Author)

A83-13697**THERMAL AND OPTICAL ANALYSIS OF AN EVACUATED CIRCULAR CYLINDRICAL CONCENTRATING COLLECTOR**

C. J. SALTIEL and M. SOKOLOV (Tel Aviv University, Tel Aviv, Israel) *Solar Energy*, vol. 29, no. 5, 1982, p. 391-396. refs

An evacuated concentrating circular cylindrical collector has been numerically investigated by ray tracing analyses. The optical efficiency of the collector is found by following incident rays onto the collector cover, calculating the amount of energy absorbed by the receiver for each ray, and then integrating the energy for all rays. Absorption and reflection losses in the collector materials are considered, as well as the formation of ray cascades. A thermal radiation exchange factor between the collector receiver and the cover, needed to find the thermal radiation losses, is also determined using ray tracing techniques. The collector overall efficiency was found for the case of a selective surface coating on the inner receiver cylinder and for the case of an absorbing fluid contained within a semi-transparent inner cylinder. The addition of a highly reflective thermal radiation coating of the inner surface of the cover, in order to suppress thermal radiation losses, was also evaluated. (Author)

A83-13698**TRANSPORT OF SOLAR ENERGY WITH OPTICAL FIBRES**

J. M. CARIQU, J. DUGAS, and L. MARTIN (Toulouse III, Universite, Toulouse, France) *Solar Energy*, vol. 29, no. 5, 1982, p. 397-406. Research supported by the Centre National de la Recherche Scientifique. refs

In order to facilitate the use of concentrated solar energy its transport in optical fibres is studied. Transmission properties of fibres as well as geometrical conditions of the association between fibres and concentrator are investigated. It is shown that modules where one fibre is associated with a small parabolic mirror may supply 2 W with an efficiency greater than 70 per cent, whilst the concentration on the exit end of a 10-m long fibre may exceed 3000. Such a device has been achieved and the experimental results are in good agreement with the preliminary study. Some further developments and interesting applications are indicated. (Author)

A83-13699**OPTIMIZATION OF PARABOLIC TROUGH SOLAR COLLECTORS**

A. RABL (Solar Energy Research Institute, Golden, CO; Princeton, University, Princeton, NJ), P. Bendt, and H. W. Gaul (Solar Energy Research Institute, Golden, CO). *Solar Energy*, vol. 29, no. 5, 1982, p. 407-417. Research supported by the Solar Energy Research Institute refs (Contract EG-77-C-01-4047)

The results of a detailed optical analysis of parabolic trough solar collectors are summarized by a few universal graphs and curve fits. These graphs enable the designer of parabolic trough collectors to calculate the performance and optimize the design with a simple hand calculator. The method is illustrated by specific

examples that are typical of practical applications. The sensitivity of the optimization to changes in collector parameters and operating conditions is evaluated. (Author)

A83-13700**50 PER CENT MORE OUTPUT POWER FROM AN ALBEDO-COLLECTING FLAT PANEL USING BIFACIAL SOLAR CELLS**

A. CUEVAS, A. LUQUE, J. EGUREN, and J. DEL ALAMO (Madrid, Universidad Politecnica, Madrid, Spain) *Solar Energy*, vol. 29, no. 5, 1982, p. 419, 420.

A83-13701**A METHOD OF RATING SOLAR COLLECTORS**

J. P. KENNA (University College, Cardiff, Wales) *Solar Energy*, vol. 29, no. 5, 1982, p. 431-434

The difficulties faced by the consumer in evaluating the thermal performance of a collector are summarized. Whereas collectors can be classified in terms of the quantity of energy they provide in a reference solar heating system, the classification may not be applicable in other locations or for changes in system design. It is shown that the thermal performance of collectors can be rated according to the normalized loss coefficient. The collector rating can then be used together with system performance prediction methods and economic and durability factors to decide upon the best collector for a given application. It is stressed that this normalized loss coefficient can be used to categorize solar collectors but not to compare them absolutely. C.R.

A83-13702**POLYCRYSTALLINE P-WSE₂ AS PHOTOCATHODE IN AN ELECTROCHEMICAL SOLAR CELL**

R. M. CANDEA (Institutul de Tehnologie Izotopica si Moleculara, Cluj, Rumania) and P. STETIU (Institutul de Tehnologie Izotopica si Moleculara; Cluj, Universitatea, Cluj, Rumania) *Solar Energy*, vol. 29, no. 5, 1982, p. 435, 436. refs

Polycrystalline WSe₂ photoelectrodes were formed by pressing a 99.99% pure compound of the elements into 1 mm thick disks under 1 billion N/sq m pressure at 300 K. A p-type conductivity was detected after the contacts were attached, as well as a Hall mobility of 540 sq cm/Vsec. Current-potential curves were obtained for operation in a homogeneous electrochemical cell under potentiostatic and potentiodynamic conditions, keeping the illumination above 0.4 microns and below the IR. An enhanced hydrogen production was produced by depositing a 50 Å thick Ag layer on the electrode. The cathodic photocurrent was three orders of magnitude less than that observed with monocrystalline WSe₂. Tests were also performed with a wet junction solar cell configuration with Pt as the other electrode. The poor performance of the material is suggested to result from low surface quality, and further work on chemical pretreatment of the WSe₂ photoelectrode surface is recommended. M.S.K.

A83-13743***GENERAL CONTAMINATION CRITERIA FOR OPTICAL SURFACES**

J. C. BREMER (ORI, Inc., Space Engineering Div., Silver Spring, MD) In: *Shuttle optical environment; Proceedings of the Meeting*, Washington, DC, April 23, 24, 1981. Bellingham, WA, SPIE - The International Society for Optical Engineering, 1982, p. 10-19. refs

(Contract NAS5-25607)

Physical models are developed for establishing criteria to decide on the acceptable contamination level of optical devices in space-borne conditions. Optical systems can be degraded in terms of decreased throughput, i.e., transmissivity or reflectivity, or increases in the total integrated scatter (TIS). Performance losses can be caused by particulate accretion, molecular film accretion, and impact cratering. A quantitative relationship is defined for film thickness and loss of throughput. Formulas are also developed for cases where induced surface defects are larger than the desired viewing wavelengths, or smaller or of the same order of the observed wavelengths. The techniques are used to quantify the

02 SOLAR ENERGY

degradation of a VUV solar coronagraph, a VUV stellar telescope, and a solar cell due to TIS. Applications are projected for estimating the contamination sensitivity of specific instruments, assessing the contamination hazard from known particulates, or to define clean room standards. M.S.K.

A83-13807#

POWER CONDITIONING IN AN AUTONOMOUS SYSTEM CONTROLLED BY A MICROPROCESSOR SIMULATION OF USE WITH A PHOTOVOLTAIC GENERATOR [CONDITIONNEMENT DE PUISSANCE D'UN SYSTEME AUTONOME GERE PAR MICROPROCESSEUR - SIMULATION D'UNE UNITE A GENERATEUR PHOTOVOLTAIQUE]

H. WINARNO Toulouse, Ecole Nationale Supérieure d'Electrotechnique, Electronique, Informatique et Hydraulique, Docteur-Ingenieur Thesis, 1981. 112 p. In French. refs

A hybrid computer code is formulated to model the behavior of autonomous systems with a triangular structure when the power output is large and control is effected with a microprocessor. A previously developed model for dc-dc conversion is extended to the case of dc-ac conversion. Consideration is given to use of an INTEL 8085 chip, a 1 kWe concentrator photovoltaic system, a storage battery, and a resistive receiver. The model was divided into simulations of the power circuit and the circuit at a low level of control, thus allowing simulation of operations under partial commands. The simulation code is noted to reduce previous computer times for modeling such systems by a factor of 200. Additionally, the model is as effective with a series of power conditioners as it is with a sole unit. Simulations performed are representative of 10 msec sampling intervals with actual installations in real time. M.S.K.

A83-13922* University of Southern California, Los Angeles. **OPTICAL ABSORPTION COEFFICIENT AND MINORITY CARRIER DIFFUSION LENGTH MEASUREMENTS IN LOW-COST SILICON SOLAR CELL MATERIAL**

R. T. SWIMM (Southern California, University, Los Angeles, CA) and K. A. DUMAS (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA) Journal of Applied Physics, vol. 53, Nov. 1982, p. 7502-7504. Research sponsored by the U.S. Department of Energy refs (Contract JPL-955612; NSF ECS-81-13428)

A83-13923* Case Western Reserve Univ, Cleveland, Ohio **PLANAR MULTIJUNCTION HIGH VOLTAGE SOLAR CELL CHIP**

G. J. VALCO, V. J. KAPOOR (Case Western Reserve University, Cleveland, OH), and J. C. EVANS, JR. (NASA, Lewis Research Center, Cleveland, OH) Journal of Applied Physics, vol. 53, Nov. 1982, p. 7566-7571. NASA-supported research. refs

A new innovative planar multijunction solar cell chip for concentrated sunlight applications is proposed. The chip consists of many voltage-generating regions, called unit cells, which are connected in series within a single silicon wafer, thereby providing a high open-circuit voltage at multiple sun illumination levels. The unit cells are fabricated on 75 micron thick p-type single crystal silicon substrate. Each chip consists of 1.42×9.63 mm n(+)/p collecting junctions on the back of the wafer, while the illuminated front surface area is divided into 0.3 micron deep n(+) regions. The fabrication sequence includes standard degreasing and cleaning procedures, double-sided alignment photomasking, introduction of boron and phosphorus impurities, and photolithography. The open circuit voltage of the chip increased rapidly with illumination up to about 4 AM1 suns, and then began to saturate at the sum of the individual unit cell voltages of 3.5 above 4 AM1 suns. A short circuit density per unit cell of 300 mA/sq cm at 20 AM1 suns was observed. C.D.

A83-14109#

A STUDY OF DIFFERENT TECHNIQUES FOR COOLING SOLAR CELLS IN CENTRALIZED CONCENTRATOR PHOTOVOLTAIC POWER PLANTS [ETUDE DE DIFFERENTS PROCEDES DE REFROIDISSEMENT DES PHOTOPILES DANS LES CENTRALES PHOTOVOLTAIQUES A CONCENTRATION]

J.-P. FORTEA Toulouse III, Université, Docteur Ingenieur Thesis, 1981 164 p. In French. refs

Methods of cooling solar cells in concentrator assemblies in centralized power plants are examined with regard to feasibility, performance, and cost factors. The lowered efficiencies in Si, Ge, and GaAlAs-GaAs solar cells at elevated temperatures are noted, and the passive cooling system built into the mechanical architecture of the SOPHOCLE 1000 system is described. The cells were mounted on aluminum dissipators equipped with cooling fins. Second generation systems were investigated to achieve further cost reductions, and a numerical model was devised for the cooling operations. Passive coolers were found to be possible for GaAs concentrator assemblies with intensities of up to 500 suns, producing acceptable efficiencies. Passive cooling is not, however, feasible for Si cells over 100 suns concentration for 4 sq cm cells, and 150 suns for 1 sq cm cells. Evaluations of forced air and phase change active cooling systems demonstrate that the phase change, using for example, water, permits substantial weight and cost savings, depending on the particular application. M.S.K.

A83-14512

A NEW METHOD FOR EXPERIMENTAL DETERMINATION OF THE SERIES RESISTANCE OF A SOLAR CELL

G. L. ARAUJO and E. SANCHEZ (Madrid, Universidad Politecnica, Madrid, Spain) IEEE Transactions on Electron Devices, vol. ED-29, Oct 1982, p. 1511-1513. refs

A83-14513

A P-I-N HETEROJUNCTION MODEL FOR THE THIN-FILM CUINSE2/CDS SOLAR CELL

A. ROTHWART (Drexel University, Philadelphia, PA) IEEE Transactions on Electron Devices, vol. ED-29, Oct. 1982, p. 1513-1515. refs

By treating the high-resistivity CdS and CuInSe₂ layers in high-efficiency cells as insulating, a simple p-i-n model results that predicts the behavior seen in these cells. The relatively low open-circuit voltage and the diode factor are both directly related to the width of the insulating CdS layer. Substantial improvements in both V sub OC and fill factor can be expected if the width of this CdS layer can be reduced. (Author)

A83-14671#

EFFECT OF OFF-SOUTH ORIENTATION ON THE PERFORMANCE OF COLLECTOR REFLECTOR SYSTEM IN INDIA

A. DANG and J. K. SHARMA (Indian Institute of Technology, New Delhi, India) Regional Journal of Energy, Heat and Mass Transfer, vol. 4, Oct. 1982, p. 271-283. refs

The effect of off-south orientation on the performance of a collector-reflector system is analyzed for two locations in India, New Delhi (L = 28.38 deg N) and Madras (L = 13.0 deg N). The enhancement of solar energy falling on the solar collector due to the use of the plane reflector is calculated as a function of the solar altitude and the azimuthal angles, the off-south orientation of the collector, and the relative sizes and tilt angles of both collector and reflector, while the amount of collector area shaded due to the presence of the reflector is considered. Results show that for a certain location, the instantaneous solar energy absorbed by a unit area of the collector is a function of the collector tilt with the horizontal, the reflector tilt with the horizontal, the relative sizes of the reflector and the collector, and the off-south angle. The conditions for the maximum solar energy absorbed per unit area of collector for the twelve average days in the year for the two locations are presented in graphical form. N.B.

A83-15130

TESTING OF THE ENERGY MODULE OF A PARABOLOCYLINDRICAL SOLAR INSTALLATION [ISPYTANIIA ENERGETICHESKOGO MODULIA SOLNECHNOI PARABOLOTSILINDRICHESKOI USTANOVKI]

B. V. TARNIZHEVSKII, I. I. KOKHOVA, S. N. ALIEV, V. A. SAMOILOV, and S. F. ERGASHEV (Gosudarstvennyi Nauchno-Issledovatel'skii Energeticheskii Institut, Moscow, USSR) *Geliotekhnika*, no. 5, 1982, p. 19-23. In Russian.

The paper presents results of full-scale tests of the operation of the energy module of a parabolocylindrical solar installation with a heat pipe at working temperatures to 300 C. The tests included: investigation of the behavior of the heat pipe under heating by nonuniform concentrated solar flux; examination of the operating modes of the heat pipe; determination of the energy characteristics of the module; assessment of the time lag of the module; and testing of the parabolocylindrical module with a thermoelectric generator. The results which are presented include typical curves of change of solar radiation and heat-pipe temperature, as well as plots of experimental profiles of the heat-pipe wall temperature, and energy characteristics of the

A83-15131

AUTOMATIC METHODS FOR THE ADJUSTMENT OF FACETED SOLAR-ENERGY CONCENTRATORS AND HELIOSTATS [AVTOMATICHESKIE METODY IUSTIROVKI FATSETNYKH KONTSENTRATOROV I GELIOSTATOV SOLNECHNOI ENERGI]

R. A. ZAKHIDOV, R. A. KHAKIMOV, A. A. ABDURAKHMANOV, I. U. M. SIZOV, and V. K. BARANOV (Akademiia Nauk Uzbekskoi SSR, Tsentral'noe Proektno-Konstruktorskoe Biuro Nauchnogo Prirostoeniia, Uzbek SSR) *Geliotekhnika*, no. 5, 1982, p. 23-26. In Russian.

An automatic adjustment technique is described which makes possible a considerable simplification of the operation of solar-energy installations. Diagrams of devices for the automatic adjustment of the facets of a composite concentrator and of a plane heliostat are presented. An error analysis shows that the accuracy of the adjustment method is 4-5 arcmin. B.J.

A83-15132

THERMAL ENERGY STORAGE UNITS FOR SOLAR ELECTRIC POWER PLANTS [AKKUMULIATORNYE TEPLOVOI ENERGI DLIYA SOLNECHNYKH ELEKTROSTANTSII]

V. I. GUDKOV and K. N. CHAKALEV (Gosudarstvennyi Nauchno-Issledovatel'skii Energeticheskii Institut, Moscow, USSR) *Geliotekhnika*, no. 5, 1982, p. 27-31. In Russian. refs

Several types of heat storage units for solar power plants with thermodynamic cycles of energy conversion are examined, including specific-heat units (particularly water-vapor devices), thermochemical units, and phase-change units. The dependence of specific capital costs for heat storage units upon time of operation is discussed, and particular consideration is given to types of connections of specific-heat units into the thermal circuit of a power plant, and to a phase-change unit that uses a heat pipe for internal heat transport. B.J.

A83-15133

INVESTIGATION OF THE EQUATIONS OF MOTION OF THE HELIOSTATS OF A TOWER-TYPE SOLAR ELECTRIC POWER PLANT [ISSLEDOVANIIE URAVNENII DVIZHENIIA GELIOSTATOV SOLNECHNOI ELEKTRICHESKOI STANTSII BASHENNOGO TIPA]

M. N. KACHANOVSKII and V. M. DUBILOVICH (Gosudarstvennyi Nauchno-Issledovatel'skii Energeticheskii Institut, Belorussian SSR) *Geliotekhnika*, no. 5, 1982, p. 31-35. In Russian.

A83-15135

REGULATION OF THE DIURNAL VARIATION OF THE COLD PRODUCTIVITY OF AN ADSORPTION-TYPE SOLAR REFRIGERATION SYSTEM [REGULIROVANIIE SUTOCHNOGO GRAFIKA KHOLODOPROIZVODITEL'NOSTI ABSORBTSIONNOI KHOLODIL'NOI SOLNECHNOI USTANOVKI]

O. KLYSHCHAEVA, A. KAKABAEV, and G. REDZHEPOV (Akademiia Nauk Turkmen'skoi SSR, Nauchno-Proizvodstvennoe Ob'edinenie Solntse, Ashkhabad, Turkmen SSR) *Geliotekhnika*, no. 5, 1982, p. 44-50. In Russian.

The paper examines various modes of operation of an adsorption-type solar refrigeration system, which make it possible to extend the operation of the system, which make it possible to extend the operation of the system to periods when there is no sunlight. It is shown that the diurnal variation of cold productivity can be determined through the establishment of the time variation of the water content of the solution. Cold-productivity plots are presented for characteristic modes of operation of the system. Consideration is given to the mode of operation where the period of operation of the refrigeration part coincides with the period of sunlight. B.J.

A83-15136

CONCERNING THE IMPROVEMENT OF SOLAR HEATING AND COOLING SYSTEMS [K VOPROSU SOVERSHENSTVOVANIIA SISTEM SOLNECHNOGO TEPIKHLADOSNABZHENIIA]

I. U. K. RASHIDOV (Tashkentskii Zonal'nyi Nauchno-Issledovatel'skii Institut Eksperimental'nogo Proektirovaniia Zhilykh i Obshchestvennykh Zdanii, Tashkent, Uzbek SSR) *Geliotekhnika*, no. 5, 1982, p. 68-73. In Russian. refs

It is suggested that systems of solar heating and cooling can be simplified by the use of 'organized hydrothermal processes' (OHP) in the elements (e.g., circulation systems and heat storage units) of such systems. This paper defines and classifies such processes. Design diagrams are presented for two types of systems: (1) a heating, hot-water, and storage system with one-phase OHPs; and (2) a gravity-assisted heat pipe and an adsorption-type solar refrigeration system with two-phase OHPs. B.J.

A83-15371* Houston Univ., Tex.

REFRACTORY RESIDUES, CONDENSATES AND CHONDRULES FROM SOLAR FURNACE EXPERIMENTS

E. A. KING (Houston, University, Houston, TX) In: Lunar and Planetary Science Conference, 13th, Houston, TX, March 15-19, 1982, Proceedings. Part 1. Washington, DC, American Geophysical Union, 1982, p. A429-A434. refs (Contract NAGW-178)

Vertical access solar furnace experiments have produced refractory residues, condensates and chondrules that are similar to components of chondritic meteorites. In particular, Ca-Al-rich refractory residues similar in chemistry to inclusions in carbonaceous chondrites have been produced by partial evaporation of basaltic bulk rock samples. Fe-Mg-Si-rich condensates with distinctive microbotryoidal morphology have been collected from the same sample runs. Particle coatings and aggregates with virtually identical microbotryoidal morphology and major element chemistry have been identified in both the Allende and Murchison meteorites. Spattered drops from melt beads undergoing heating and partial evaporation resemble some meteoritic chondrules in their mineralogies, textures, grain size, and sorting. The spatter mechanism is highly efficient in the production of chondrules. If any of the refractory inclusions in chondrites are, in fact, partial evaporation residues, many meteoritic fluid drop chondrules must have been formed by this process. The hot central portion of the solar nebula, acting on a cloud of dust and gas, is the probable source of heat required to produce the fractionated chemistry and physical state of many of the components of chondritic meteorites. (Author)

02 SOLAR ENERGY

A83-15452 COMMERCIAL PHOTOVOLTAICS MEASUREMENTS WORKSHOP, VAIL, CO, JULY 27-29, 1981, PROCEEDINGS

S. HOGAN, (ED.) (Solar Energy Research Institute, Golden, CO) and H. A. SCHAFFT (National Bureau of Standards, Washington, DC) Workshop sponsored by the U.S. Department of Energy Solar Cells, vol. 7, Nov. 1982 211 p.

Various topics in the area of commercial photovoltaics measurements are discussed. The topics considered include: the status of measurements for commercial photovoltaics; a manufacturer's perspective of measurement equipment needs for the photovoltaics industry; the use of test structures in the production of CdS/Cu₂S photovoltaic devices; the Semiconductor Equipment and Materials Institute specification for solar cell silicon; the role of impurities in silicon solar cell performance; spectroradiometer measurements in support of photovoltaic device testing. Also addressed are the calibration of pyrheliometers and pyranometers for testing photovoltaic devices; progress in the development of standard procedures for the global method of calibration of photovoltaic reference cells; status and perspectives of photovoltaic systems measurements, the use of measurements to detect electrical problems in operational photovoltaic arrays; experience with specifications applicable to certification; development of a standard test method for measuring photovoltaic cell performance. C.D.

A83-15454

A MANUFACTURER'S PERSPECTIVE OF MEASUREMENT EQUIPMENT NEEDS FOR THE PHOTOVOLTAICS INDUSTRY

W. R. BOTTENBERG (ARCO Solar, Inc., Chatsworth, CA) (U.S. Department of Energy, Commercial Photovoltaics Measurements Workshop, Vail, CO, July 27-29, 1981) Solar Cells, vol. 7, Nov. 1982, p. 51-54.

The photovoltaics industry has developed and is still developing unique needs for inspection and measurement tools and techniques. In some areas, equipment and working systems are in place for the present but, in most places, existing tools are inadequate for the present industry. Standards and material specifications remain to be created. For future industry growth a great deal of work must be done to support incoming material inspection, process control and product inspection and testing. (Author)

A83-15455

USE OF TEST STRUCTURES IN THE PRODUCTION OF CDS/CU₂S PHOTOVOLTAIC DEVICES

E. D. CASTEL and M. J. SOUBEYRAND (Photon Power, Inc., El Paso, TX) (U.S. Department of Energy, Commercial Photovoltaics Measurements Workshop, Vail, CO, July 27-29, 1981.) Solar Cells, vol. 7, Nov. 1982, p. 69-72.

The usefulness of a test structure as a tool in the manufacture of large-area CdS/Cu₂S solar cell arrays is shown. The electrical parameters measured on the test structure are presented as an isometric density plot which yields a global image of the photovoltaic quality of the substrate used. (Author)

A83-15457

ROLE OF IMPURITIES IN SILICON SOLAR CELL PERFORMANCE

N. G. SAKIOTIS (Motorola, Inc., Semiconductor Group, Phoenix, AZ) (U.S. Department of Energy, Commercial Photovoltaics Measurements Workshop, Vail, CO, July 27-29, 1981.) Solar Cells, vol. 7, Nov. 1982, p. 87-96. refs

The effects and tolerable quantities of impurities in solar cells are discussed. Attention is given to metallic and oxygen impurities which are shown, from experimental results, to have an acceptable concentration level between 1-100 trillion atoms/cu cm. The types and magnitudes of impurities introduced into solar cells during fabrication steps are quantified. It is noted that control of the impurity levels on the scale required is not possible with present techniques, but can be implemented through monitoring of key performance parameters such as the bulk minority carrier diffusion length, the open-circuit voltage, and junction-voltage characteristics.

The methods would be applied to qualifying and inspecting the initial substrates and also on-line quality control during cell fabrication. M.S.K

A83-15458

SPECTRORADIOMETER MEASUREMENTS IN SUPPORT OF PHOTOVOLTAIC DEVICE TESTING

G. A. ZERLAUT and J. D. MAYBEE (DSET Laboratories, Inc., Phoenix, AZ) (U.S. Department of Energy, Commercial Photovoltaics Measurements Workshop, Vail, CO, July 27-29, 1981.) Solar Cells, vol. 7, Nov. 1982, p. 97-106.

The spectroradiometer is capable of complete solar spectral measurements approximately 7 min apart in both the global and the direct beam modes, all in the wavelength range 280-2500 nm. Global measurements can be made at any azimuth and altitude position, the field of view of the pyrheliometer comparison tube is 6 deg. Typical spectra show that the resolution is sufficient to identify Fraunhofer absorption bands in the surface of the sun. Data are presented that show the relationship between direct beam spectra and two specific microenvironments. The differences observed are analyzed in terms of the significance of microenvironment haze and pollution to the efficiency of concentrating photovoltaic devices. (Author)

A83-15461

PHOTOVOLTAIC SYSTEMS MEASUREMENTS - STATUS AND PERSPECTIVES

R. DEBLASIO (Solar Energy Research Institute, Golden, CO) (U.S. Department of Energy, Commercial Photovoltaics Measurements Workshop, Vail, CO, July 27-29, 1981.) Solar Cells, vol. 7, Nov. 1982, p. 159-163.

An account of the present status of, and trends toward, photovoltaic systems standards by the IEEE Photovoltaic Systems Standards Committee is given. Photovoltaic systems measurement consensus standards projects are detailed and future needs are discussed. (Author)

A83-15463* Jet Propulsion Lab., California Inst. of Tech., Pasadena.

EXPERIENCE WITH SPECIFICATIONS APPLICABLE TO CERTIFICATION

R. G. ROSS, JR. (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA) (U.S. Department of Energy, Commercial Photovoltaics Measurements Workshop, Vail, CO, July 27-29, 1981.) Solar Cells, vol. 7, Nov. 1982, p. 197-201.

The Jet Propulsion Laboratory has developed a number of photovoltaic test and measurement specifications to guide the development of modules toward the requirements of future large-scale applications. Experience with these specifications and the extensive module measurement and testing that has accompanied their use is examined. Conclusions are drawn relative to three aspects of product certification: performance measurement, endurance testing and safety evaluation. (Author)

A83-15476

RAPID SIMULATED SOLAR ABSORPTANCE MEASUREMENTS ON FLAT OR CURVED SURFACES

G. L. HARDING, M. LAKE, S. CRAIG, and B. WINDOW (Sydney, University, Sydney, Australia) Solar Energy Materials, vol. 7, Sept.-Oct. 1982, p. 129-137. Research supported by the University of Sydney and Science Foundation for Physics. refs

The construction of an instrument to determine the solar absorptances of surfaces within one minute is described. Values of absorptance measured for highly specular and diffusely reflecting absorbing surfaces agree within 0.01 with values of AM2 absorptance calculated from reflectance vs. wavelength data. Techniques are described where the instrument may be calibrated for measurement of absorptance of selective surfaces enclosed within concentric tubular collectors. (Author)

A83-15479**BLACK CHROME SOLAR SELECTIVE COATINGS OPTIMIZED FOR HIGH TEMPERATURE APPLICATIONS**

R. B. PETTIT, R. R. SOWELL, and I. J. HALL (Sandia National Laboratory, Albuquerque, NM) *Solar Energy Materials*, vol. 7, Sept.-Oct. 1982, p. 153-170. refs
(Contract DE-AC04-76DP-00789)

Results of an investigation into the variables observable in the process of electrodeposition of black chrome coatings for solar selective surfaces to predict the thermal stability of the coatings are presented. Attention was given to the bath composition, the plating current density, the bath temperature, the substrate, and the plating time, with performance assessed in terms of the solar absorptance values, as well as the emittance. Accelerated thermal aging tests were performed on the specimen plates. Low concentrations of chromium and addition agents in the bath produced the most stable coatings, which displayed emittance values of 0.17-0.18 after heating to 300 C. Adding silver oxide to the plating bath reduced the chloride ion concentration, and increased the thermal stability of the coating. The best coatings displayed less than 1% decrease in absorptance after 40 hr at 450 C, and the same value only after 5600 hr at 350 C. A detailed process specification is provided, including such manufacturing steps as surface preparation and rinsing procedures M.S.K

A83-15480**POLYCRYSTALLINE LANTHANUM RHODATE AND LUTETIUM RHODATE PHOTOELECTRODES FOR LIQUID JUNCTION SOLAR CELLS**

M. ZAFRIR, M. HALMANN, and B. AURIAN-BLAJENI (Weizmann Institute of Science, Rehovot, Israel) *Solar Energy Materials*, vol. 7, Sept.-Oct. 1982, p. 171-181. Research supported by the Ministry of Energy and Bundesministerium fuer Forschung und Technologie. refs

A83-15482**OPTICAL PROPERTIES OF GOLD-MAGNESIA SELECTIVE CERMETS**

D. MAZIERE-BEZES and J. VALIGNAT (Commissariat a l'Energie Atomique, Laboratoire d'Etudes des Materiaux Minces, Grenoble, France) *Solar Energy Materials*, vol. 7, Dec. 1982, p. 203-211. refs

The deposition of homogeneous Au-MgO selective cermets on solar collector surfaces by dc reactive cosputtering is described, together with an assessment of the solar activity of the materials. A commercial planar magnetron device was employed with argon as the working gas and oxygen as the reacting gas. The surfaces were deposited on glass slides, and polished copper, and carbon films were sputtered onto copper grids and copper wafers. A high metallic content was found to be necessary to produce satisfactory solar absorptance with the Au-MgO cermet. The temperature of the substrate and the deposition technique were found to be significant factors during manufacturing. More precise examinations are recommended in order to successfully develop a theoretical model for the cermet-surfaced solar selective surface. M.S.K

A83-15483* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

LAYERED TRANSITION METAL THIOPHOSPHATES /MPX3/ AS PHOTOELECTRODES IN PHOTOELECTROCHEMICAL CELLS

C. E. BYVIK (NASA, Langley Research Center, Hampton, VA), B. T. SMITH, and B. REICHMAN (Christopher Newport College, Newport News, VA) *Solar Energy Materials*, vol. 7, Sept.-Oct. 1982, p. 213-223. refs

Layered crystals of the transition metal thiophosphates were synthesized and characterized for use as photoelectrodes in photoelectrochemical cells. Crystals incorporating tin and manganese show n-type response while those with iron and nickel show p-type response. These materials have a measured indirect bandgap of about 2.1 eV. They show ability to photoelectrolyze water in acid solutions with onset potentials which change in a Nernstian way as the PH of the solution changes. The onset potential is near zero volts versus a saturated calomel electrode

at pH 2. At n-type crystals, oxygen could be evolved upon irradiation at underpotentials of 850 mV and at p-type crystals, hydrogen could be evolved at underpotentials of 400 mV, indicating a net gain in energy conversion. All crystals were unstable in basic solution. Liquid junction photovoltaic cells in iodide-triiodide acid solution using these layered materials were also constructed and found to have low efficiencies. (Author)

A83-15488**SPECTRAL SELECTIVITY OF HIGH-TEMPERATURE SOLAR ABSORBERS. II EFFECTS OF INTERFERENCE**

D. M. TROTTER, JR and A. J. SIEVERS (Cornell University, Ithaca, NY) *Solar Energy Materials*, vol. 7, Dec. 1982, p. 281-289. refs

(Contract DE-FG02-80CS-83113; NSF DMR-76-81083)

Previous numerical calculations of the normal incidence solar absorptivity α_s of model spectrally selective solar absorbers are extended to include fully graded layers with small index mismatches to free space at their front surfaces. If the magnitude of the mismatch and the thickness of the layer are properly chosen, the resulting interference effects allow formation of thin (approximately 2500 Å) layers with α_s values comparable with those found in much thicker fully graded layers continuous at the layer-free space interface. The thermal emissivities of these thinner layers are expected to be similar to those of thicker layers having the same α_s . (Author)

A83-15490**THE OPTICAL PROPERTIES OF TITANIUM NITRIDES AND CARBIDES SPECTRAL SELECTIVITY AND PHOTOTHERMAL CONVERSION OF SOLAR ENERGY**

L. ROUX, J. HANUS (Aix-Marseille II, Universite, Marseille, France), J. C. FRANCOIS, and M. SIGRIST (Aix-Marseille I, Universite, Marseille, France) *Solar Energy Materials*, vol. 7, Dec. 1982, p. 299-312. refs

A83-15492**LARGE GRAIN POLYCRYSTALLINE SILICON FROM RICE HUSK**

D. N. BOSE, P. A. GOVINDACHARYULU, and H. D. BANERJEE (Indian Institute of Technology, Kharagpur, India) *Solar Energy Materials*, vol. 7, Dec. 1982, p. 319-321. Research supported by the Ministry of Science and Technology. refs

Rice-husk may constitute a viable alternative raw material for production of solar grade silicon. Powdered silicon obtained by Mg reduction of rice-husk ash was subjected to melting and directional solidification resulting in large-grain polycrystalline silicon ingots. The material was found to be p-type with resistivity 0.1-0.3 ohm-cm within the grains. The hole concentration was 8×10^{16} to 1.7×10^{17} /cm³ and mobility 69 sq cm/Vs as found from Hall effect studies. Steady-state photoconductivity indicated electron life-times greater than one-millionth of a second which is promising for photovoltaic applications. The conductivity activation energy of 0.045 eV showed that B was the active impurity. (Author)

A83-15493**OXYGEN EVOLUTION IMPROVEMENT AT A CR-DOPED SrTiO₃ PHOTOANODE BY A RU-OXIDE COATING**

P. SALVADOR, V. M. FERNANDEZ (Consejo Superior de Investigaciones Cientificas, Instituto de Catalisis y Petroleoquimica, Madrid, Spain), and C. GUTIERREZ (Consejo Superior de Investigaciones Cientificas, Instituto de Quimica-Fisica, Madrid, Spain) *Solar Energy Materials*, vol. 7, Dec. 1982, p. 323-329. Research supported by the U.S.-Spain Program of Cultural Cooperation. refs

The performance for water photo-oxidation of a Cr-doped SrTiO₃ photoanode coated with a Ru-oxide film is studied. The experimental results, which are interpreted in terms of a two-interface model, could support those previously obtained with RuO₂-coated, colloidal CdS microelectrodes. This seems to open new perspectives in the stabilization of photocorrosion prone electrodes for solar energy conversion. (Author)

02 SOLAR ENERGY

A83-15496

ON THE PROPERTIES OF THE SUPERPLASTIC ALUMINIUM-CALCIUM ALLOY AS MATERIAL FOR SOLAR COLLECTORS

G. PELLEGRINI, P. BRUGHERA, and F. QUAZZO (Commission of the European Communities, Joint Research Centre, Ispra, Italy) *Solar Energy Materials*, vol. 7, Dec. 1982, p. 351-357. refs

The aluminum-calcium alloy of eutectic composition (7.5 wt% Ca) combine superplastic with selective optical properties. It possesses a low emissivity in the infrared around 85 °C and an absorption peak in the visible at wavelengths between 700 and 900 nm. Anodization of the alloy produces a homogeneous protective film light gray of color. Anodized alloy specimens exposed to solar irradiations under a vacuum of 0.01 mm Hg reach temperatures not very far from those obtained using conventional selective coatings. (Author)

A83-15497

AN INVESTIGATION OF DEPOSITION PARAMETER DEPENDENCE OF OPTICAL PROPERTIES, MICROSTRUCTURE AND THERMAL STABILITY OF BLACK CHROME SELECTIVE SURFACES

J. C. MABON, O. T. INAL, and A. J. SINGH (New Mexico Institute of Mining and Technology, Socorro, NM) *Solar Energy Materials*, vol. 7, Dec. 1982, p. 359-376. U.S. Department of Energy refs (Contract DOE-78-04-4226)

A83-15499

INFLUENCE OF DEPOSITION RATE ON THE CHARACTER OF ELECTRODEPOSITED CdSe USED FOR PHOTOELECTROCHEMICAL CELLS

R. A. BOUDREAU and R. D. RAUH (EIC Laboratories, Inc., Newton, MA) *Solar Energy Materials*, vol. 7, Dec. 1982, p. 385-391. refs (Contract XP-9-8002-7)

The electrodeposition of CdSe from aqueous solutions containing Cd(2+) and SeO₂ under acidic conditions results in the formation of films useful in photoelectrochemical solar cells. For given concentrations of reagents, a rather narrow range of current densities are specified to prevent formation of separate islands of Cd or Se. Electrolyte compositions enabling high deposition rates produce the most active layers, but films deposited at high rates often result in inhomogeneous deposits of separated Cd and Se when irregular substrate shapes are used. A photoelectrochemical cell conversion efficiency of 6.7% was achieved at 80 mW/sq cm tungsten-halogen white light intensity for CdSe electroplated on Ti in contact with an aqueous polysulfide electrolyte. (Author)

A83-15509

SCHOTTKY REVISITED

H. K. HENISCH, J. W. PARK (Pennsylvania State University, University Park, PA), J.-C. MANIFACIER, and Y. MOREAU (Pennsylvania State University, University Park, PA; Montpellier II, Université, Montpellier, France) *Solar Energy Materials*, vol. 8, Nov. 1982, p. 91-100. refs

The present investigation is concerned with the characteristics of the Schottky model, taking into consideration also unsolved difficulties and limits regarding the application of the model. Two aspects not satisfactorily handled are related to the notion of charge continuity and the problem of electronic space charges. Difficulties also arise in the analysis of composite barriers. In connection with model applications, it must be taken into account that the Schottky model is strictly a single carrier model. Accordingly, it is quite wrong to accept its predictions for systems which involve holes as well as electrons. Nor is modification of the model simple, because such a modification cannot be achieved by analytic means. The transport relationships in many contact systems (e.g., solar cells) become analytically insoluble, and the exploration of the involved problems by computer techniques is inevitable. The relationships are generally too involved to permit intuitive predictions of the results. G.R.

A83-15510

RECENT ADVANCES IN AMORPHOUS SILICON SOLAR CELLS

Y. HAMAKAWA (Osaka University, Toyonaka, Japan) *Solar Energy Materials*, vol. 8, Nov. 1982, p. 101-121. refs

The advantages, device physics, research efforts, and the state-of-the-art in amorphous Si solar cells are discussed. Studies have shown that an optimal device thickness of 0.5-0.7 micron would realize significant material savings. Furthermore, the films can be deposited on any substrate, have a low balance of systems costs, and can be scaled up easily to mass production. Various experimental techniques to characterize the plasma deposition mechanism are discussed, noting the identification of diverse parameters affecting the quality of the cells produced. Cells having a conversion efficiency around 8% have been fabricated, and a-Si:F:H films are reported which show no performance degradation due to photo-induced changes. Additionally, a photovoltaic-photothermal hybrid has been fabricated, showing a solar total energy conversion efficiency of 55-60%. M.S.K.

A83-15511

THE RESIDUAL VOLTAGE IN FAST ELECTROPHOTOGRAPHY OF A-SiH_x/X

S. ODA, S.-I. TERAZONO, and I. SHIMIZU (Tokyo Institute of Technology, Yokohama, Japan) *Solar Energy Materials*, vol. 8, Nov. 1982, p. 123-128. refs

The space charge distribution in a-SiH(x) photoreceptors is investigated by measurement of the residual voltage in xerographic photodischarge characteristics. The correlation between boron concentrations in the a-SiH(x) photoreceptor and the residual voltage is evaluated. It is found that the space charge is localized within 5000 Å of the interface, and that the residual voltage can be eliminated by a proper choice of the boron concentration and of the wavelength of the exciting light. (Author)

A83-15871

HYDROGENATED A-Si_x/Ge_{1-x} - A POTENTIAL SOLAR CELL MATERIAL

M. C. CRETELLA and J. A. GREGORY (Mobil Solar Energy Corp., Waltham, MA) *Electrochemical Society, Journal*, vol. 129, Dec. 1982, p. 2850-2855. refs

Attempts to improve the bandgap of a-Si amorphous solar cells were carried out with alloys of a-SiGe(H). The cells were prepared with a plasma glow discharge technique to produce cells with an optical energy gap of 1.0 eV, compared with 1.8 eV for a-Si(H). Changing the ratio of SiH₄/GeH₄ in the plasma allowed adjustment of the bandgap towards the optimal efficiency in the solar spectrum. Spectral response tests revealed that the a-SiGe(H) cells had shifted their response to longer wavelength regions, although degradations were observed in the open-circuit voltage and fill factor. The addition of Ge to the H-doped amorphous solar cells is concluded to offer the possibility of an improved amorphous solar cell material. M.S.K.

A83-16021

CHANGES IN PHOTOVOLTAIC AND DARK ELECTRICAL PROPERTIES OF HYDROGENATED AMORPHOUS SILICON DIODES INDUCED BY FORWARD BIAS CARRIER INJECTION

I. SAKATA and Y. HAYASHI (Ministry of International Trade and Industry, Electrotechnical Laboratory, Sakura, Ibaraki, Japan) *Electronics Letters*, vol. 18, Dec. 9, 1982, p. 1075, 1076. Research supported by the Ministry of International Trade and Industry refs

The photovoltaic and dark electrical properties of hydrogenated amorphous silicon diodes were changed by forward bias carrier injection for several hours. These changes were similar to photoinduced (PI) changes previously reported, and this result supports previous explanations for PI changes. The differences between these two types of change are also discussed. (Author)

A83-16071**TRANSPORT MECHANISMS FOR MG/ZN3P2 JUNCTIONS**

F.-C. WANG, A. L. FAHRENBRUCH, and R. H. BUBE (Stanford University, Stanford, CA) *Journal of Applied Physics*, vol. 53, Dec. 1982, p. 8874-8879. Research supported by the Solar Energy Research Institute. refs

The dominant transport mechanisms for Mg/Zn3P2 junctions are shown to depend on the heat treatment in hydrogen of the Zn3P2 prior to Mg deposition. For heat treatments below 300 C, multistep tunneling via defect centers dominates, whereas for heat treatments between 300 and 500 C, recombination/generation dominates. Correspondence is observed between the imperfections responsible for the junction transport and previously reported imperfections in bulk Zn3P2 crystals. Enhanced tunneling under solar illumination contributes to the low energy conversion efficiency of thin Mg film Mg/Zn3P2 devices. An estimate of the interface recombination velocity for these junctions yields a value of 19,000,000 cm/sec. (Author)

A83-16082**EFFECT OF HYDROGEN ON THE DEPOSITION RATE FOR PLANAR RF MAGNETRON SPUTTERING OF HYDROGENATED AMORPHOUS SILICON**

J. B. WEBB (National Research Council, Div. of Chemistry, Ottawa, Canada) *Journal of Applied Physics*, vol. 53, Dec. 1982, p. 9043-9048. refs

A83-16084**HEAT-TREATMENT STUDIES ON THIN-FILM CDS/CU/X/S SOLAR CELLS**

L. HMURCIK (Clarkson College of Technology, Potsdam, NY) and R. A. SERWAY (James Madison University, Harrisonburg, VA) *Journal of Applied Physics*, vol. 53, Dec. 1982, p. 9073-9079 refs

(Contract DE-AC01-79ET-23110)

CdS/CuS polycrystalline solar cells were heat treated in different mixtures of hydrogen and oxygen and examined for the resultant I-V curves. Ten cells were studied, six which were heat treated, then kept in storage for one year. Monitoring was also carried out on the short-circuit current density, the open circuit voltage, the fill factor, and the cell efficiency. Several episodes of heat treatment were performed, with measurements carried out after each. It was determined that changes in the copper-sulfide stoichiometry were the cause of changes in the short-circuit current. Monitoring the changes in the short-circuit current during heating in a hydrogen atmosphere permitted optimization of the cell efficiency to within 5% of its theoretical value. The hydrogen-atmosphere heating is noted to increase the CuS layer stoichiometry. M.S.K.

A83-16086**EVALUATION OF THERMOPHOTOVOLTAIC CONVERSION EFFICIENCY**

F. DEMICHELIS, E. MINETTI-MEZZETTI, M. AGNELLO, and E. TRESSO (Torino, Politecnico, Turin, Italy) *Journal of Applied Physics*, vol. 53, Dec. 1982, p. 9098-9104. refs

The efficiency of thermophotovoltaic (TPV) cell is numerically modeled and results from experimentation with a TPV device are reported. The TPV concept involves a cell which absorbs all incident radiation above its band-gap, then reflects all photons outside of the bandgap back to the source as IR radiation, thus augmenting the source heat. The cell was mounted above an electrical resistive heater element which operated behind a quartz lens, a low pressure chamber, and walls coated with gold to enhance reflectivity. Computations were made in terms of the input power, the temperature of the heating element, and the photovoltaic efficiency. The TPV efficiency was found at times to be nearly 30 times the normal solar cell output. Good agreement was obtained between the predictions and the experimental results. M.S.K.

A83-16183**THE PROPERTIES AND PRODUCTION OF SOLAR CELLS**

R. HILL (Newcastle-upon-Tyne Polytechnic, Newcastle-upon-Tyne, England) *Sun at Work in Britain*, no. 15, 1982, p. 1-8.

The operational characteristics, techniques of large scale production, the use, and materials for solar cells are reviewed. Attention is given to optimizing cell performance. A maximum theoretical efficiency of 40% is possible, with laboratory specimens thus far attaining 20% levels and mass-produced cells 10-18%. Series and parallel connections of cells in modules to yield specific outputs are considered, together with nominal construction considerations to make the modules resistant to environmental corrosion and the effects of shading from other modules. Ribbon, crystal ingot, and thin film production technologies are discussed, with mention made of the fact that crystalline cells are more expensive, yet have the highest efficiencies, while thin films offer low-cost, mass-production advantages although only 5% efficiencies have been attained with production-scale thin films. Finally, solar cell materials, including Si, CdS, InP, GaAs, and CdTe are investigated, along with prospects for indigenous solar cell production facilities in various countries. M.S.K.

A83-16184**PHOTOVOLTAIC PROSPECTS IN EUROPE**

M. R. STARR (Sir William Halcrow and Partners, Swindon, Wilts., England) *Sun at Work in Britain*, no. 15, 1982, p. 9-20. Commission of the European Communities refs

(Contract CEC-ESC-P-049-81-UK)

The economics of solar cells is reviewed with an eye to potential cost reductions in processing, and potential markets are explored. Current solar cell systems costs are noted to be on the road to achieving the U.S. DoE goals of \$0.40/kWp by 1990. Continued progress will depend on technical developments in cheaper materials and processes, scaling up production, and the success of sales programs. Various consumer and professional markets are outlined, with a prediction that a 12 MWp demand will be reached as a steady state by 1995. Photovoltaic panels may conceivably replace conventional roofing materials, resulting in the projection that, if grid-supplied power continues to inflate in price, then all new European homes would be equipped with photovoltaics by the year 2000. Further, accomplishment of the cost goals could generate a 1 GWp/yr industrial market at the same time. M.S.K.

A83-16562#**THEORETICAL AND EXPERIMENTAL INVESTIGATION OF HIGH TEMPERATURE INSULATORS SUBJECTED TO INTENSE VISIBLE RADIATION**

L. K. MATTHEWS (New Mexico State University, Las Cruces, NM) *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting*, 21st, Reno, NV, Jan. 10-13, 1983, 16 p. refs

(AIAA PAPER 83-0158)

A theoretical and experimental investigation has been performed to determine the radiation and thermal fields in high temperature insulators such as zirconia and alumina-silica. Various material parameters (optical and thermophysical), such as extinction coefficient, backward scattering fraction, thermal diffusivity, and thermal conductivity were estimated using a theoretical model along with experimental data. The techniques of nonlinear parameter estimation (inversion) were formulated to optimally determine the parameters. The experimental investigation was performed in a solar furnace with front surface heat fluxes as high as 600 kW/sq m. Temperatures and transmitted heat fluxes were measured for test samples made of zirconia. The theory of optimal experiment design was used to determine how to best take the data. An extensive statistical error analysis of the parameter estimates was performed, and the resulting parameter estimates should be considered as preliminary. The procedures for using a theoretical model, experimental data and statistical inversion techniques that were developed performed well and showed that considerable information can be obtained from the solar testing of such insulators. (Author)

02 SOLAR ENERGY

A83-16946

HOT-ELECTRON LUMINESCENCE IN AGED ELECTRODEPOSITED CDSE LIQUID-JUNCTION SOLAR CELL

R. P. SILBERSTEIN and M. TOMKIEWICZ (Brooklyn College, Brooklyn, NY) Applied Physics Letters, vol 42, Jan. 1, 1983, p. 58-60. refs

(Contract XS-9-8312-1)

Raman spectroscopy and scanning Auger electron spectroscopy (AES) have been used to probe the surface of polycrystalline, electrodeposited CdSe photoelectrodes which have been aged in a polysulfide electrolyte under illumination and in darkness. Characteristic 'hot-electron' luminescence has been observed at multiples of omega (LO) (CdS) = 305/cm in the light-aged electrode, indicating that a surface layer of CdS has been formed. AES profiling shows that extensive substitution of S for Se has occurred, in the light-aged electrode alone, to a depth of approximately 600 Å. Measurements at 300 K suggest that Raman scattering can be a useful, in situ, contactless, nondestructive probe of CdS formation. (Author)

A83-17150

DESIGN OF ELECTRONIC OPTIMIZER FOR SOLAR ELECTRIC DRIVE SYSTEM

E.-H. T. EL-SHIRBEENY (University of Technology, Baghdad, Iraq) International Journal of Energy Research, vol 6, Oct.-Dec 1982, p. 367-376. refs

The design for an electronic optimizer connected to the photovoltaic converter circuit for a solar electric powered pumping station is presented. The generator assembly considered is a series of solar cell modules, and is equipped with a low-pass filter to screen out radio frequency and higher harmonics which can degrade system performance. Optimization of the voltage output is shown to depend on the presence of a control device and a passive storage subsystem at the load terminals. The electronic optimizer described comprises an IC chip for incorporating internal power supplies with reference voltages, a sawtooth generator, a comparator, a power transistor, and operation from 3-18 V dc. A block diagram is furnished of the optimizer circuitry. The optimizer assures optimum voltage under all insolation conditions, relying on a servo chopper to maintain highest efficiencies. M S K.

A83-17347

DEVELOPMENT OF THE SPHERICAL SILICON SOLAR CELL

W. R. MCKEE (Texas Instruments Central Research Laboratories, Dallas, TX) (Institute of Electrical and Electronics Engineers, Electronic Components Conference, 32nd, San Diego, CA, May 10-12, 1982.) IEEE Transactions on Components, Hybrids, and Manufacturing Technology, vol CHMT-5, Dec. 1982, p. 336-341. refs

(Contract DE-AC01-79ER-100000)

A unique photovoltaic/electrochemical solar energy conversion/storage system utilizing silicon spheres as the individual photovoltaic elements is being developed at Texas Instruments. A new technology has been developed to produce high-purity single-crystal silicon spheres at high throughput rates. The spherical geometry offers several advantages including high crystal growth rate, simplified in-process material flow, and excellent silicon material utilization. The silicon sphere production process is discussed and the device efficiency status and goals are presented. (Author)

A83-17493

ENVIRONMENTALLY INDUCED DISCHARGES IN A SOLAR ARRAY

D. B. SNYDER (Case Western Reserve University, Cleveland, OH) (IEEE, DOD, NASA, and DOE, Annual Conference on Nuclear and Space Radiation Effects, 19th, Las Vegas, NV, July 20-22, 1982.) IEEE Transactions on Nuclear Science, vol. NS-29, Dec. 1982, p. 1607-1609. refs

The charging and discharging characteristics of an electrically isolated solar array segment are studied. The details of the test apparatus are described, the surface voltage profiles as a function of the beam angle of incidence are discussed, and the discharge

transient characteristics are presented. The results from the biased array are given to provide a comparison with the floating array results. A relatively slow, repetitive discharge is seen at low electron densities which releases about 10% of the charge on the array. Single faster discharges are seen which release currents on the order of microamps for a few tenths of a second. Minor discharges emit about 4% of the charge, while major discharges emit about 90%. The slow and fast minor discharges appear to be smaller than the discharges induced by biasing the interconnects negative with respect to the cover slides. C.D.

A83-17766

THIN FILM POLYCRYSTALLINE SI P-N JUNCTION SOLAR CELLS WITH PREFERENTIAL DOPING

S. ELNAHWY and N. ADEEB (Cairo, University, Giza, Egypt) Solid-State Electronics, vol. 25, Nov. 1982, p. 1111-1117. refs

A model has been introduced for a polycrystalline thin film silicon p-n junction solar cell with preferential doping along the grain boundaries. Detailed numerical calculations have been done for the effect of doping depths along the grain boundaries, for different grain sizes, on the performance of the cell under AM1 conditions. The results indicate that preferential doping of grain boundaries leads to significant improvement of the cell performance. (Author)

A83-17767

THEORY OF OPEN CIRCUIT PHOTO-VOLTAGE IN DEGENERATE ABRUPT P-N JUNCTIONS

D. V. KUMAR and S. K. SHARMA (Indian Institute of Technology, New Delhi, India) Solid-State Electronics, vol. 25, Dec 1982, p. 1161-1164 Research supported by the Indian National Science Academy refs

A83-17770

ON THE OPEN-CIRCUIT VOLTAGE OF A SCHOTTKY-BARRIER MIS SOLAR CELL

A N DAW, A. K. DATTA, and M. C. ASH (Indian Institute of Radio Physics and Electronics, Calcutta, India) Solid-State Electronics, vol 25, Dec. 1982, p. 1205, 1206. refs

A83-17801

DESIGN OF A 13% EFFICIENT N-GAAS/1-X/P/X/ SEMICONDUCTOR-LIQUID JUNCTION SOLAR CELL

C. M. GRONET and N. S. LEWIS (Stanford University, Stanford, CA) Nature, vol. 300, Dec. 23, 1982, p. 733-735. refs

The design of the most efficient nonaqueous semiconductor-liquid junction solar cell studied to date is reported. Ternary semiconductor electrodes made from solid solutions of GaP and GaAs were utilized. Changes in the open voltage circuit voltage were studied for these materials as a function of solution potential with a variety of redox reagents, and it was found that photoanodes consisting of these materials are capable of simultaneously yielding high open circuit voltages and favorable wavelength response to the solar spectrum. Thirteen percent efficiencies were obtained with no deliberate attempts to optimize fully donor densities, reflectivity losses, and surface treatments. C.D.

A83-18139

A PARAMETRIC ANALYSIS OF THE PERFORMANCES OF A LINEAR COLLECTORS' NETWORK OF A SOLAR POWER PLANT

C. BELLECCI, A. BONANNO, M. CAMARCA, M. CONTI, L. LA ROTONDA, G. PICCINI, and R. VISENTIN (Calabna, Università, Rende, Italy) Nuovo Cimento C, Serie 1, vol. 5C, May-June, 1982, p. 359-373. Research supported by the Consiglio Nazionale delle Ricerche. refs

A83-18451

HEAT TRANSFER AND FLUID MECHANICS INSTITUTE, MEETING, 28TH, CALIFORNIA STATE UNIVERSITY, SACRAMENTO, CA, JUNE 28, 29, 1982, PROCEEDINGS

F. M. REARDON, (ED.) (California State University, Sacramento, CA) Meeting sponsored by the American Society of Mechanical Engineers and California State University, Sacramento, CA, CSUS University Publications, 1982. 219 p.

Various topics in fluid mechanics, heat transfer, and solar and wind energy conversion were discussed. Consideration was given to numerical modeling of the mass flow, pressure, and temperature in air-medium flat plate solar collectors. Computer simulations of three-dimensional confined vortex flow were reported, as was a study of the priming characteristics of monogroove heat pipes in the zero-g environment of a Space Operations Center. The unsteady heating of a solid body by a hot gaseous jet was explored. A northwest California wind energy survey for wind farm sites was described. Finally, an analytic treatment of the benefits of using dynamic inducer tip vanes on wind turbine rotors was presented.

D.H.K.

A83-18452

AN ANALYTICAL INVESTIGATION OF MASS FLOW, PRESSURE AND TEMPERATURE IN A FLAT-PLATE SOLAR COLLECTOR

H. T. PHAN (California Department of Transportation, Sacramento, CA) and N. D. THINH (California State University, Sacramento, CA) In: Heat Transfer and Fluid Mechanics Institute, Meeting, 28th, Sacramento, CA, June 28, 29, 1982, Proceedings. Sacramento, CA, CSUS University Publications, 1982, p. 17-33. refs

A study of mass flow, pressure and temperature interactions in a flatplate solar collector is presented with the assumption that the working fluid is compressible with friction and no phase change. The theoretical analysis is based on compressible flow and heat transfer fundamentals together with the working equations which are widely used in solar energy applications. The results of this study show that: (1) the fluid temperature approaches the tube wall temperature asymptotically as $1/D$ increases for fixed inlet and insulation conditions, (2) the fluid pressure decreases as the ratio of tube length to tube diameter ($1/D$) increases, (3) the mass flow rate increases as $1/D$ increases. (Author)

A83-18497#

INTERACTION OF ELECTROMAGNETIC RADIATION AND MICROSTRUCTURAL MATERIALS WITH REGARD TO THE PRODUCTION OF SPECTRAL-SELECTIVE SOLAR ABSORBERS [WECHSELWIRKUNG VON ELEKTROMAGNETISCHER STRAHLUNG UND MIKROSTRUKTURIERTER MATERIE IM HINBLICK AUF DIE ERZEUGUNG SPEKTRALSELEKTIVER SOLARABSORBER]

W. SCHERBER Stuttgart, Universitaet, Fakultaelektrotechnik, Dr.-Ing Dissertation, 1981. 145 p. In German. refs

New theoretical and technological solutions for solar-selective absorption layers are presented. The theory of optical structural filters is discussed, including scattering from individual particles, and systems of large and very small particles. For the first of these, the calculation of effective factors and anisotropy factors, as well as the results of Mie theory, are dealt with. For very small particle systems, the role of effective refractive index and of Lorentz-Lorenz theory are covered. For larger-particle systems, two- and six-ray theories, anisotropic directional factors, and inhomogeneous packing density are addressed. The theory is experimentally tested for the construction of filter structures, including subtractive and electrochemical procedures, vacuum and gas-phase separation, and thermal conversion. Results are also found for individual components such as needle structures, powder structures, and macrostructures. The application of the theory to the optimization of pigment layers and of needle, powder, and pore structures is discussed. C.D.

A83-18554

SOLAR ENERGY STORAGE BY THE REVERSIBLE REACTION - N2O4 YIELDS 2NO2 - THEORETICAL AND EXPERIMENTAL RESULTS

V. RAGAINI (Sassan, Universita, Sassari, Italy) Solar Energy, vol. 29, no. 6, 1982, p. 535-540. refs

The suitability of the reversible reaction between N_2O_4 and $2NO_2$ for short term solar energy storage applications were examined theoretically and experimentally. N_2O_4 dissociates completely at 140 C, while NO_2 seldom dissociates below 150 C. The heat storage capacity of the reaction $2NO_2$ yields N_2O_4 was calculated for the temperature intervals between 0-500 C, showing that a maximum of 195.7 kcal/l is available with liquified $2NO_2$, compared to 100 kcal/l with water. Nitrogen dioxide was tested in the gas phase in a solar collector. The results indicate a heat storage capacity from 3 to 1.7 times that of water, and its use for a domestic hot water energy source is described. Toxicity problems with $2NO_2$ and the formation of nitric acid are suggested to be solvable by use of nitrogen dioxide in anhydrous form and in stainless steel apparatus. M.S.K.

A83-18557

UNIVERSAL GRAPH FOR OPTIMAL DIMENSIONS OF SOLAR COLLECTOR PLATE

M. KOVARIK (Commonwealth Scientific and Industrial Research Organization, Div. of Mechanical Engineering, Highett, Victoria, Australia) Solar Energy, vol. 29, no. 6, 1982, p. 573, 574.

A83-18558

A NEW EVACUATED CPC COLLECTOR TUBE

J. J. OGALLAGHER, K. SNAIL, R. WINSTON (Chicago, University, Chicago, IL), C. PEEK (GTE Research Laboratories, Waltham, MA), and J. D. GARRISON (San Diego State University, San Diego, CA) Solar Energy, vol. 29, no. 6, 1982, p. 575-577. refs (Contract DE-AC02-80ER-10558)

Design features, performance goals, and test results with components of a complete panel of a new evacuated compound parabolic concentrator (CPC) solar heat collector are presented. Performance gains over previous designs were projected to accrue from placing the reflector surface in a vacuum to eliminate surface degradation, and the use of a glass cover eliminated the need for an external glazing, a step that improves the optical efficiency. Isolation of the glass vacuum enclosure from the metal absorber ensures that thermally induced breakage of the vacuum seal does not occur. No tilt adjustments are included in the module design, which features a fixed 35 deg acceptance angle. The mirrored surface provides a 1.64 power concentration. A prototype installation yielded 40% efficiencies over an ambient-300 C range. The CPC is intended for applications in building heat and cooling, industrial process heat, and low temperature electricity generation. M.S.K.

A83-18559

PROJECTED TEMPERATURE DEPENDENCE OF QUANTUM YIELDS FOR PHOTOREACTIONS INVOLVING ENERGY OR ELECTRON TRANSFER

G. JONES, II and R. J. BUTLER (Boston University, Boston, MA) Solar Energy, vol. 29, no. 6, 1982, p. 579-587. Research supported by the U.S. Department of Energy. refs

Parameters are defined for developing a model for the increase in reaction rates in a photosensitive energy generation system due to the addition of heat to the system. Microscopic rate constants taken from published data are employed to calculate quantum yields and the rates of bimolecular quenching. The resultant data are used to establish the sensitivity of the energy yields and quenching rates to temperature and to the standard free energy change for electron or energy transfer. Account is also made for reorganizational energy, i.e., a geometry change or distortion. Examples were worked out for two dyes in the temperature range 273-423 K with a quencher concentration of 0.1 M. The free energy change and the decay parameters for each dye are provided, noting the use of dyes with ambient temperature lifetimes of 1-10 microsec. Easily realizable

02 SOLAR ENERGY

temperature raises were found to produce acceptable quantum efficiencies involving an endothermic electron or energy transfer step.
M.S.K.

A83-18563

STABILITY OF SnO_2 THIN FILMS USED FOR PHOTOVOLTAIC DEVICES

G. N. ADVANI and A. G. JORDAN (Carnegie-Mellon University, Pittsburgh, PA) Solar Energy, vol. 30, no. 1, 1983, p. 71-73. Research supported by the Mine Safety Appliances Co. refs (Contract EE-77-S-02-4346)

Conducting films of SnO_2 , prepared by RF Sputtering, were studied for their stability following a heat treatment at 200 C in air. Auger Spectroscopy was used to analyze the surface and bulk compositions both before and after the tests. The results so obtained, indicated that the main changes in the film took place in the first 400 Å. This was viewed as seriously limiting the efficiency of solar cells employing transparent windows on the front surface.
(Author)

A83-18564

TRANSMITTANCE OF REFLECTED DIFFUSE RADIATION

H. F. CHIAM (Commonwealth Scientific and Industrial Research Organization, Div. of Energy Technology, Highett, Victoria, Australia) Solar Energy, vol. 30, no. 1, 1983, p. 75-78. Research supported by the National Energy Research, Development and Demonstration Program refs

A correlation is developed which allows the transmittance of reflected diffuse radiation from a planar reflector to be determined. An initial evaluation of the geometric cover-to-reflector configuration, or view factor, is involved in the use of the correlation. The evaluation of the reflected irradiance on the cover requires the value of the configuration factor. The practical implications of these findings are also discussed.
N.B.

A83-18565

STUDIES ON RADIATION INTENSITY DISTRIBUTION IN THE FOCUS OF COMPOUND PARABOLIC CONCENTRATORS

I. C. MACEDO (Campinas, Universidade Estadual, Campinas, Sao Paulo, Brazil) and C. L. FARIA ALVES (Instituto Tecnológico de Aeronautica, Sao Paulo, Brazil) Solar Energy, vol. 30, no. 1, 1983, p. 79-83. Research supported by the Fundacao de Amparo a Pesquisa do Estado de Sao Paulo. refs

A83-18825

A SIMPLE PARAMETER MEASUREMENT SYSTEM FOR SOLAR CELLS

A. NEDUNGADI and R. SHARAN (Indian Institute of Technology, Kanpur, India) IEEE Transactions on Instrumentation and Measurement, vol. IM-31, Sept. 1982, p. 206, 207.

A simple measurement system which quickly obtains the relevant parameters V_{oc} , I_{sc} , P_{max} , and V_{max} of a solar cell under illumination has been described. The system has reasonably good accuracy, and should save considerable testing time and effort in applications where a large number of solar cells have to be tested, characterized, or matched.
(Author)

A83-19148

OPERATIONAL CONSIDERATIONS ON THE MOON-DAY PROJECT

M. SALMON Acta Astronautica, vol. 9, Aug. 1982, p. 515-523. refs

The potentials for illuminating any particular locale on the earth using expansive mirror arrays placed on the moon are explored, together with the design of the mirror systems. Attention is given to the astronomical parameters governing the implementation of the concept. It is found that a 10 million sq km night time area can be lighted at most 1/2 the time. A lunar mirrored area 10 sq km in area is required to produce one-moon illumination (1/1,000,000 sun). However, 10 moons are necessary for agriculture, 100 for street lighting, and 1000 for reading. It is assumed that the mirrors would be in a central lunar location. Considerations of changing illumination angles indicate that only

one region at a time on earth could be illuminated, with changes of target areas possibly occurring on a daily or yearly basis

D.H.K.

A83-19194

AXISYMMETRIC REFLECTORS OF THE STEPPED SPHERICAL TYPE

B. AUTHIER (CNRS, Laboratoire d'Astronomie Spatiale, Marseille, France) Journal of Optics, vol. 13, Sept-Oct. 1982, p. 309-315 refs

A family of rotationally symmetrical segmented reflectors, fully corrected for spherical aberration, is defined. The discontinuous meridional curve of each reflector consists of elementary mirrors parallel to the tangent of an axisymmetric curve (called the generating curve) at the point located at the same distance from the common axis. The third order aberration patterns of reflectors for which the generating curve is a circular segment are studied. This leads to the definition of easily built stepped spherical collectors of large aperture and narrow field angle, which can be used as high concentration solar collectors.
(Author)

A83-19236#

PROSPECTS FOR THE CONSTRUCTION OF SOLAR FURNACES FOR INDUSTRY [PERSPECTIVES SUR LA REALISATION DE FOURS SOLAIRES A VOCATION INDUSTRIELLE]

CH. H. LA BLANCHETAIS (CNRS, Groupe des Laboratoires de Bellevue, Meudon, Hauts-de-Seine, France) Entropie, vol. 18, no. 107-108, 1982, p. 28-61. In French. refs

The various techniques and prototype installations employed to absorb and concentrate solar energy for use in applications requiring 100-4000 C temperatures are explored. Mention is made of the Pericles heliostat field and the THEK distributed parabolic concentrator installations, and attention is focused on viable concepts useful for industrial purposes. The Odeillo solar furnace provided design guidelines and requirements for industrial usage. It was found that the reliability of the furnace depends on the annual insolation, that the solar furnaces must be designed to meet specific thermal goals, that simplification and optimization are needed for the orientation and focusing mechanisms, and that solar furnaces are ideally suited for developing nations which experience high levels of insolation. A stepped paraboloid is described for improving the efficiency of a heliostat system, while still employing plane parallel mirrors.
M.S.K.

A83-19238#

A PROJECT FOR EXPLOITATION OF A NEW FORM OF SOLAR ENERGY: THE WIND CHILL. I - THE IMPORTANCE TO THE ENERGY FIELD. II - APPLICATION FOR BUILDING HEAT AND ELECTRICITY PRODUCTION [PROJET D'EXPLOITATION D'UNE NOUVELLE FORME DE L'ENERGIE SOLAIRE: LA 'FROIDEUR DU VENT'. I - IMPORTANCE DU GISEMENT D'ENERGIE. II APPLICATION AU CHAUFFAGE DES BATIMENTS ET A LA PRODUCTION D'ELECTRICITE]

P. LE GOFF (CNRS, Laboratoire des Sciences du Genie Chimique; Lorraine, Institut National Polytechnique, Nancy, France) Entropie, vol. 18, no. 107-108, 1982, p. 122-140. In French. refs

Calculations of the temperature, humidity, pressure, and velocity of the wind at different locations are provided to demonstrate that energy characteristics of the wind other than the mechanical pressure exerted by the wind on obstacles are significant. A system is described, based on the heat pump principle, which takes advantage of the thermal inertia of the wind, known to remain around freezing even in Siberian winters. An analysis of the energy available for heat transfer in a site in France demonstrates that the dryness, warmth, or chill of a cubic meter of air contains, continuously, 100-1000 times the kinetic energy of moving air. In excess of one kilowatt/sq m is available for extraction by heat pumps based on designs for ocean thermal energy conversion. An electric generating system is described which would yield 10-50 times the mechanical power of a windmill using the same collector area. Finally, a wall heat exchanger for a house is presented which would gain heat energy proportional to the seventy of the winter wind.
M.S.K.

A83-19259
PHOTOVOLTAIC PROPERTIES OF CADMIUM
SULFIDE/TRIVALENT-METAL PHTHALOCYANINE
HETEROJUNCTION DEVICES

A.-M. HOR, R. O. LOUTFY, and C.-K. HSIAO (Xerox Research Center of Canada, Mississauga, Ontario, Canada) Applied Physics Letters, vol. 42, Jan. 15, 1983, p. 165-167. Research supported by the National Research Council of Canada. refs

Thin-film photovoltaic devices consisting of a CdS/trivalent-metal phthalocyanine heterojunction have been prepared. The devices are fabricated by first electrodepositing a thin film of CdS onto a transparent conducting indium-tin-oxide substrate and then depositing phthalocyanine and gold layers sequentially in a vacuum coater. The trivalent-metal phthalocyanines used are chloroaluminum chlorophthalocyanine, chloroaluminum phthalocyanine, and chloroindium phthalocyanine. Under an AM2 illumination of 75 mW/sq cm, these heterojunction devices produce an open-circuit voltage of 0.70 V and short-circuit current of 0.8 mA/sq cm. The conversion efficiency is about 0.2 percent, which represents one of the highest values reported for phthalocyanine photovoltaic devices at high light intensity.

(Author)

N83-10286# Kajima Inst. of Construction Technology, Tokyo (Japan).

THE SOLAR ASSISTED AIR-SOURCE HEAT PUMP SYSTEM, PART 1

T. HINO Nov. 1980 82 p refs
 (PB82-218439; KICT-35) Avail: NTIS HC A05/MF A01 CSCL 13A

A new heat pump heating and air conditioning system was proposed and tested. It features the effective utilization of climatic conditions as its heat sources and sinks, to improve the thermodynamic efficiencies. Reduced electricity consumption, utility load leveling and the least environmental pollutions are expected. The outdoor unit of this heat pump is composed of aluminum panels that are painted black to enhance the radiative heat exchange and fixed almost perpendicularly to improve the natural convective heat transfer with air. The working fluid is halocarbon and commonly used in the heat transfer circuits and the refrigeration cycle. In the heating cycle, the liquid refrigerant evaporates in the passages of the panel. When insulation to the panels is sufficient to meet the heat pump evaporator capacity, the panel temperature will be almost the same as the outdoor air temperature. Thus little convective heat loss to the surrounding air occurs. As the insulation decreases the panel temperature falls several degrees below the outdoor air to absorb heat out of the air until the equilibrium condition is reached. GRA

N83-10297# National Bureau of Standards, Washington, D.C. Center for Building Technology.

ANALYSIS OF THERMAL COMFORT IN A PASSIVE SOLAR HEATED RESIDENCE

S. LIU Nov. 1981 36 p refs Sponsored by DOE
 (PB82-180142; NBSIR-81-2393) Avail: NTIS HC A03/MF A01 CSCL 13A

The thermal comfort conditions in a passive solar heated residence of the popular Trombe Wall configuration were investigated. The indoor thermal environment of an actual passive solar residence, using the typical meteorological year (TMY) weather data tape as input as three locations of different climatic conditions was simulated. The relevant thermal comfort parameters such as the space air temperature, mean radiant temperatures, operative temperatures, radiant temperature asymmetry, and temperature drifts of the occupied zone, were computed for a prime heating month, a transition month and a prime cooling month of a typical weather year at the three locations. It is found that for the specific passive solar residence analyzed, the upper boundary of the comfort envelope can be exceeded (overheating) during a typical clear day in the transition month of April unless a change of clothing to summer wear is made during the daytime high solar radiation house. The upper boundary will be exceeded during a typical clear day in the prime cooling month of August

for a person in typical summer clothing at all three locations unless the average air movement in the occupied zone is increased above the level of natural circulation, or the thermostat setting is reduced to a lower level, or both. GRA

N83-10494* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

METHOD FOR DEPOSITING AN OXIDE COATING Patent

G. E. MCDONALD, inventor (to NASA) 21 Sep. 1982 7 p
 Filed 23 Mar. 1981 Supersedes N81-24230 (19 - 15, p 2033)
 (NASA-CASE-LEW-13131-1; US-PATENT-4,350,574;
 US-PATENT-APPL-SN-246772; US-PATENT-CLASS-204-56R)
 Avail: US Patent and Trademark Office CSCL 10A

A metal oxide coating is plated onto a metal substrate at the cathode from an acid solution which contains an oxidizing agent. The process is particularly useful for producing solar panels. Conventional plating at the cathode avoids the presence of oxidizing agents. Coatings made in accordance with the invention are stable both at high temperatures and while under the influence of high photon flux in the visible range.

Official Gazette of the U.S. Patent and Trademark Office

N83-10500# Illinois Univ., Urbana. Dept. of Mechanical and Industrial Engineering.

AN EXPERIMENTAL INVESTIGATION OF CONVECTIVE LOSSES FROM SOLAR RECEIVERS Final Report

A. M. CLAUSING Aug. 1981 27 p refs Sponsored by DOE
 (UILU-ENG-81-4003; ME-TN-81-9180-3) Avail: NTIS HC A03/MF A01

Convective energy loss from the receiver of a 10 mw solar thermal electric plant was determined. N.W.

N83-10505*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

FLAT PLATE SOLAR ARRAY PROJECT: PROCEEDINGS OF THE 20TH PROJECT INTEGRATION MEETING Progress Report, Nov. 1981 - Apr. 1982

R. R. MCDONALD Apr. 1982 543 p Meeting held at Pasadena, Calif., 21-22 Apr. 1981
 (Contract NAS7-100; DE-AI01-76ET-20356)
 (NASA-CR-169370; DOE/JPL-1012-71; JPL-PUB-82-48;
 JPL-5101-209; NAS 1.26:169370; PR-20) Avail: NTIS HC A23/MF A01 CSCL 10B

Progress made by the Flat-Plate Solar Array Project during the period November 1981 to April 1982 is reported. Project analysis and integration, technology research in silicon material, large-area silicon sheet and environmental isolation, cell and module formation, engineering sciences, and module performance and failure analysis are covered.

N83-10507*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

FSAS FUTURE ROLE

W. T. CALLAGHAN In its Flat Plate Solar Array Proj.: Proc. of the 20th Proj. Integration Meeting p 61-65 Apr. 1982
 Avail: NTIS HC A23/MF A01 CSCL 10A

The latest thinking about how the Flat-Plate Solar Array Project (FSA), will redirect activities away from recent product-oriented technology development efforts and toward longer-term research on technical problems that could limit future large-scale use of photovoltaics is addressed. With the emphasis on research, the Project is now organizing a series of workshops addressing the key basic technological questions by specific topic. Intervals between Project Integration Meetings are being extended because there are fewer contracts within ESA and because work under those contracts has been attenuated. J.M.S.

02 SOLAR ENERGY

N83-10508*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

UNION CARBIDE CORP. POLYSILICON STATUS AND PLANS
M. H. LEIPOLD *In its Flat Plate Solar Array Proj.* Proc. of the 20th Proj. Integration Meeting p 67-69 Apr 1982
Avail: NTIS HC A23/MF A01 CSCL 10A

The status of polysilicon activities is summarized highlighted by moving the silane portion of the experimental process system development unit (EPSDU) to Washougal, Washington. The completion and operation of the silane EPSDU, is discussed along with research on the silane-to-silicon deposition process. Progress on the dichlorosilane process is also reported J.M.S.

N83-10509*# Kayex Corp., Rochester, N. Y.

ADVANCED CZOHCRAISKI INGOT GROWTH
R. L. LANE *In JPL Flat Plate Solar Array Proj.* Proc. of the 20th Proj. Integration Meeting p 71-98 Apr 1982
Avail: NTIS HC A23/MF A01 CSCL 10A

A summary of advanced Cz ingot-growth activities is presented. Five ingots (totalling 150 kg) were grown from one crucible by use of chunk silicon replenishment between ingot pulls. The cost of the ingot growth was reduced from \$80/kg (conventional Cz growth) to \$20/kg. Further improvements can be made by achieving a better understanding of crystalline silicon growth and the influence on growth of contaminants from the atmosphere and/or the crucible. This should lead to a higher percentage of monocrystalline growth and possible increased growth rates. J.M.S.

N83-10510*# Jet Propulsion Lab., California Inst. of Tech., Pasadena

BLOCK 5 MODULE DESIGN SUMMARY
L. D. RUNKLE *In its Flat Plate Solar Array Proj.* Proc. of the 20th Proj. Integration Meeting p 99-103 Apr 1982
Avail: NTIS HC A23/MF A01 CSCL 10A

The Flat Plate Solar Array Block 5 Module design efforts of six manufacturers are summarized. Residential designs and module designs for intermediate-load applications are described. It is planned that a few prototype modules of each design will be fabricated. The modules incorporate advanced concepts, are larger than earlier ones and have high power output. J.M.S.

N83-10511*# Sandia Labs., Albuquerque, N. Mex.

CENTRAL-STATION APPLICATIONS: SYSTEM AND SUBSYSTEM RESEARCH ACTIVITIES
G. J. JONES *In JPL Flat Plate Solar Array Proj.* Proc. of the 20th Proj. Integration Meeting p 105-111 Apr 1982
Avail: NTIS HC A23/MF A01 CSCL 10A

The results of a number of photovoltaic central power-station studies are summarized. Analysis based upon vendor quotes and construction contractor bids indicate that \$50/m² for area related costs for flat-plate arrays is achievable. Electrical design tradeoffs for multimegawatt systems are considered. The values of photovoltaic central-station plants for various regions are determined from an energy scenario effects study J.M.S.

N83-10512*# Aerospace Corp., El Segundo, Calif.

PV LARGE SYSTEMS PROJECT
S. L. LEONARD *In JPL Flat Plate Solar Array Proj.* Proc. of the 20th Proj. Integration Meeting p 113-122 Apr 1982
Avail: NTIS HC A23/MF A01 CSCL 10A

Near term photovoltaic central-station markets are analyzed. Cost effectiveness of photovoltaic plants is determined in terms of reduction of oil consumption. The breakeven photovoltaic system cost vs oil-steam power generation is given. The value of photovoltaic power plants in Southern California and in Los Angeles is given in terms of fuel savings and capacity value. The potential value of third party financing, facilitated by Federal and state tax incentives is analyzed J.M.S.

N83-10513*# Jet Propulsion Lab., California Inst. of Tech., Pasadena

SACRAMENTO MUNICIPAL UTILITY DISTRICT 100-MW SUB E PHOTOVOLTAIC PLANT
R. V. POWELL *In its Flat Plate Solar Array Proj.* Proc. of the 20th Proj. Integration Meeting p 123-124 Apr 1982
Avail: NTIS HC A23/MF A01 CSCL 10B

A status report on plans for the Sacramento Municipal Utility District (SMUD) 1-MW photovoltaic power plant is presented. DOE, the California Energy Commission, and SMUD will fund the project cooperatively. Emphasis is placed on the details of the government contract/cooperation agreement.

N83-10514*# Spectrolab, Inc., Sylmar, Calif

PV HISTORY: LESSONS FOR THE FUTURE
E. L. RALPH *In JPL Flat Plate Solar Array Proj.* Proc. of the 20th Proj. Integration Meeting p 131-135 Apr 1982
Avail: NTIS HC A23/MF A01 CSCL 10A

A history of terrestrial photovoltaics is presented indicating that the photovoltaic potential was well perceived and a good technology development plan was formulated and implemented. Major accomplishments of the technology plan are highlighted. Research objectives and research needs for the future are outlined. J.M.S.

N83-10515*# Lincoln Lab., Mass. Inst. of Tech., Lexington.

ROOFTOP APPLICATIONS
E. KERN *In JPL Flat Plate Solar Array Proj.* Proc. of the 20th Proj. Integration Meeting p 147-150 Apr 1982
Avail: NTIS HC A23/MF A01 CSCL 10A

Research on residential photovoltaic power systems based upon the experience of MIT-LL in implementing the DOE Residential Demonstration Project, especially the Northeast Residential Experiment Station (NE RES) is discussed. There is an immediate need for improved power-conditioner operational and reliability capabilities. Continuing evaluation of photovoltaic power systems is required to verify long-term performance, reliability, and utility interface effects. In the long term, the price of photovoltaic power systems must decrease, especially of modules. J.M.S.

N83-10516*# Mobil Tyco Solar Energy Corp., Waltham, Mass.
PHOTOVOLTAIC RESEARCH NEEDS INDUSTRY PERSPECTIVE

K. V. RAVI *In JPL Flat Plate Solar Array Proj.* Proc. of the 20th Proj. Integration Meeting p 155-160 Apr 1982
Avail: NTIS HC A23/MF A01 CSCL 10A

An industries perspective of photovoltaic research needs is presented. Objectives and features of industry needs are discussed for the materials, devices, processes, and reliability research categories. J.M.S.

N83-10517*# Pennsylvania Univ., Philadelphia
RESEARCH POSSIBILITIES? NO! NEEDS FOR RESEARCH TO MAKE PV SOLAR ENERGY UTILIZATION BROADLY COMPETITIVE

M. WOLF *In JPL Flat Plate Solar Array Proj.* Proc. of the 20th Proj. Integration Meeting p 161-169 Apr 1982
Avail: NTIS HC A23/MF A01 CSCL 10A

The historical progression of efficiency improvements, cost reductions, and performance improvements in modules and photovoltaic systems are described. The potential for future improvements in photovoltaic device efficiencies and cost reductions continues as device concepts, designs, processes, and automated production capabilities mature. Additional step-function improvements can be made as today's simpler devices are replaced by more sophisticated devices. J.M.S.

N83-10518*# Midwest Research Inst., Golden, Colo.
EVALUATION OF ADVANCED R AND D TOPICS IN PHOTOVOLTAICS

T. SUREK *In JPL Flat Plate Solar Array Proj.: Proc. of the 20th Proj. Integration Meeting p 171-178 Apr. 1982*
 Avail: NTIS HC A23/MF A01 CSCL 10A

An evaluation of advanced research and development topics in photovoltaic that is summarized. The intent was to develop priorities in a list of advanced research and development activities. Thirty-five activities in 10 major categories were evaluated by their contributions to basic scientific advances, potential impact on further technology development by private industry, and priorities for federal advanced research and development funding. J.M.S.

N83-10519*# Union Carbide Corp., Tonawanda, N.Y.
FLAT-PLATE COLLECTOR RESEARCH AREA: SILICON MATERIAL TASK

R. LUTWACK *In JPL Flat Plate Solar Array Proj.: Proc. of the 20th Proj. Integration Meeting p 179-226 Apr. 1982* Prepared in cooperation with Solarelectronics, Inc., Hemlock Semiconductor Corp., Mich., and JPL
 Avail: NTIS HC A23/MF A01 CSCL 10A

Silane decomposition in a fluidized-bed reactor (FBR) process development unit (PDU) to make semiconductor-grade Si is reviewed. The PDU was modified by installation of a new heating system to provide the required temperature profile and better control, and testing was resumed. A process for making trichlorosilane by the hydrochlorination of metallurgical-grade Si and silicon tetrachloride is reported. Fabrication and installation of the test system employing a new 2-in.-dia reactor was completed. A process that converts trichlorosilane to dichlorosilane (DCS), which is reduced by hydrogen to make Si by a chemical vapor deposition step in a Siemens-type reactor is described. Testing of the DCS PDU integrated with Si deposition reactors continued. Experiments in a 2-in.-dia reactor to define the operating window and to investigate the Si deposition kinetics were completed.

Author

N83-10520*# Westinghouse Electric Corp., Pittsburgh, Pa.
LARGE-AREA SILICON SHEET TASK

A. D. MORRISON *In JPL Flat Plate Solar Array Proj.: Proc. of the 20th Proj. Integration Meeting p 227-320 Apr. 1982* Prepared in cooperation with Mobil Tyco Solar Energy Corp., Semix, Inc., Cornell Univ., Ithaca, NY, Illinois Univ., Chicago and Applied Solar Energy Corp.

Avail: NTIS HC A23/MF A01 CSCL 10A

A set of computer models was used to define a growth system configuration that was then built and used to grow web with lower thermally generated stress. Aspects of research in the edge-defined film-fed growth (EFG) method of making Si ribbon are reported. A technique was developed to determine base resistivity and carrier lifetime in semicrystalline wafers. Automated growth of 150 kg of 15 cm-dia ingot material per crucible is reviewed. Scanning transmission electron microscopy (STEM) and microprobe investigations of processed EFG ribbon are reported. The chemical composition of the large precipitates was studied. The structural arrangement and the electrical activity of dislocations or close to the central twin plane in processed material were studied. The electrical and structural properties of grain boundaries in silicon are discussed. Temperature-dependence measurements of zero-bias conductance, a photoconductivity technique, and deep-level transient spectroscopy (DLTS) were developed. A grooving and staining technique, secondary ion mass spectroscopy, and EBIC measurements in scanning electron microscopy were used to study enhanced diffusion of phosphorus at grain boundaries in polycrystalline silicon. The fundamental mechanisms of abrasion and wear and the deformation of Si by a diamond in various fluid environments are described. The efficiency of solar cells made from EFG ribbon and Semix Inc. material is reported. Author

N83-10521*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

ENVIRONMENTAL ISOLATION TASK

C. D. COULBERT *In its Flat Plate Solar Array Proj.: Proc. of the 20th Proj. Integration Meeting p 321-361 Apr. 1982* Prepared in cooperation with Sprngborn Labs., Inc. and Spectrolab, Inc., Sylmar, Calif.

Avail: NTIS HC A23/MF A01 CSCL 10A

The failure-analysis process was organized into a more specific set of long-term degradation steps so that material property change can be differentiated from module damage and module failure. Increasing module performance and life are discussed. A polymer aging computer model is discussed. Early detection of polymer surface reactions due to aging is reported. Author

N83-10522*# Ross (Bernd) Associates, San Diego, Calif.
CELL AND MODULE FORMATION RESEARCH AREA

D. B. BICKLER *In JPL Flat Plate Solar Array Proj.: Proc. of the 20th Proj. Integration Meeting p 363-426 Apr. 1982* Prepared in cooperation with JPL, Spectrolab, Inc., Sylmar, Calif., Photowatt International, Inc., Spire Corp., Solarex Corp., Westinghouse Electric Corp., Pittsburgh, and Pennsylvania Univ., Philadelphia
 Avail: NTIS HC A23/MF A01 CSCL 10A

Metallization is discussed. The influence of hydrogen on the firing of base-metal pastes in reducing atmospheres is reported. A method for optimization of metallization patterns is presented. A process sequence involving an AR coating and thick-film metallization system capable of penetrating the AR coating during firing is reported. Design and construction of the NMA implantation machine is reported. Implanted back-surface fields and NMA primary (front) junctions are discussed. The use of glass beads, a wave-soldering device, and ion milling is reported. Processing through the module fabrication and environmental testing of its design are reported. Metallization patterns by mathematical optimization are assessed. Author

N83-10523*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

ENGINEERING SCIENCES AREA AND MODULE PERFORMANCE AND FAILURE ANALYSIS AREA

R. G. ROSS, JR. and L. D. RUNKLE *In its Flat Plate Solar Array Proj.: Proc. of the 20th Proj. Integration Meeting p 427-528 Apr. 1982* Prepared in cooperation with Lincoln Lab., Lexington
 Avail: NTIS HC A23/MF A01 CSCL 10A

Photovoltaic-array/power-conditioner interface studies are updated. An experiment conducted to evaluate different operating-point strategies, such as constant voltage and pilot cells, and to determine array energy losses when the array is operated off the maximum power points is described. Initial results over a test period of three and a half weeks showed a 2% energy loss when the array is operated at a fixed voltage. Degraded-array studies conducted at NE RES that used a range of simulated common types of degraded I-V curves are reviewed. The instrumentation installed at the JPL field-test site to obtain the irradiance data was described. Experiments using an optical filter to adjust the spectral irradiance of the large-area pulsed solar simulator (LAPSS) to AM1.5 are described. Residential-array research activity is reviewed. Voltage isolation test results are described. Experiments performed on one type of module to determine the relationship between leakage current and temperature are reviewed. An encapsulated-cell testing approach is explained. The test program, data reduction methods, and initial results of long-duration module testing are described. Author

N83-10524*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

PROJECT ANALYSIS AND INTEGRATION AREA

R. W. ASTER and G. FOX *In its Flat Plate Solar Array Proj.: Proc. of the 20th Proj. Integration Meeting p 529-535 Apr. 1982*

Avail: NTIS HC A23/MF A01 CSCL 10A

A simulation program that investigates the relationship between manpower requirements and equipment availability in the presence

02 SOLAR ENERGY

of scheduled and unscheduled maintenance is presented. A method for optimization of metallization patterns is presented. Author

N83-10525*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

PARABOLIC DISH SOLAR THERMAL POWER ANNUAL PROGRAM REVIEW, PROCEEDINGS

J. W. LUCAS 15 Jul. 1982 347 p refs Conf. held in Atlanta, 8-10 Dec. 1981

(Contract NAS7-100; DE-AT04-81AL-16228)

(NASA-CR-169365; JPL-PUB-82-66; JPL-5105-118;

DOE/JPL-106052; NAS 1.26.169365) Avail: NTIS HC A15/MF A01 CSCL 10B

The results of activities of the parabolic dish technology and applications development element of DOE's Solar Thermal Energy System Program are presented. Topics include the development and testing of concentrators, receivers, and power conversion units; system design and development for engineering experiments; economic analysis and marketing assessment; and advanced development activities. A panel discussion concerning industrial support sector requirements is also documented.

N83-10526*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

DEVELOPMENT STATUS OF THE PDC-1 PARABOLIC DISH CONCENTRATOR

T. THOSTESEN, I. F. SOCZAK (Ford Aerospace and Communications Corp., Newport Beach, Calif.), and R. L. PONS (Ford Aerospace and Communications Corp., Newport Beach, Calif.) *In its* Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. p 3-13 15 Jul. 1982 refs

Avail: NTIS HC A15/MF A01 CSCL 10A

The status of development of the 12 m diameter parabolic dish concentrator which is planned for use with the Small Community Solar Thermal Power System. The PDC-1 unit features the use of plastic reflector film bonded to structural plastic gores supported by front-bracing steel ribs. An elevation-over-azimuth mount arrangement is employed, with a conventional wheel-and-track arrangement; outboard trunnions permit the dish to be stored in the face down position, with the added advantage of easy access to the power conversion assembly. The control system is comprised of a central computer (LSI 1123), a manual control panel, a concentrator control unit, two motor controllers, a Sun sensor, and two angular position resolvers. The system is designed for the simultaneous control of several concentrators. The optical testing of reflective panels is described. M.G.

N83-10527*# Acurex Corp., Mountain View, Calif.

ACUREX PARABOLIC DISH CONCENTRATOR (PDC-2)

P. OVERLY and R. BEDARD *In JPL Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc.* p 15-20 15 Jul. 1982

Avail: NTIS HC A15/MF A01 CSCL 10A

The design approach, rationale for the selected configuration, and the development status of a cost effective point-focus solar concentrator are discussed. The low-cost concentrator reflective surface design is based on the use of a thin, backsilvered mirror glass reflector bonded to a molded structural plastic substrate. The foundation, support, and drive subassemblies are described. A hybrid, two-axis, Sun tracking control system based on microprocessor technology was selected. Coarse synthetic tracking is achieved through a microcomputer-based control system to calculate Sun position for transient periods of cloud cover as well as sundown and sunrise positioning. Accurate active tracking is achieved by two-axis optical sensors. Results of the reflective panel demonstration tests investigating slope error, hail impact survivability, temperature/humidity cycling, longitudinal strength/bending stiffness, and torsional stiffness are discussed. M.G.

N83-10528*# Power Kinetics, Inc., Troy, N.Y.

THE PKI COLLECTOR

M. P. RICE *In JPL Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc.* p 25-34 15 Jul. 1982

Avail: NTIS HC A15/MF A01 CSCL 10A

The design and manufacturing of a solar thermal collector is discussed. The collector has three primary subsystems: concentrator, receiver/fluid loop, and controls. Identical curved reflective columns are utilized in a faceted Fresnel design to support 864 one foot square flat inexpensive second-surface, silvered glass mirrors. The columns are ganged together and rotated through their centers of gravity to provide elevation tracking. The concentrator is supported by a lightweight spaceframe structure which distributes all wind and gravity loads to the base supports. The base of the structure is a track which rotates on wheels mounted on concrete piers. A parallel tube steel heat exchanger is mounted at the concentrator focal area in a well insulated, galvanized steel housing. Two rows of vertical close-packed, staggered tubes connect a mud header and a steam header. Automatic two axis tracking and operational control is provided with a microprocessor based package. Concentrator-mounted shadowbands are the basis for active tracking. A software program provides azimuthal tracking during cloudy periods. M.G.

N83-10529*# Boeing Engineering and Construction Co., Seattle, Wash.

THIN FILM CONCENTRATOR PANEL DEVELOPMENT

D. K. ZIMMERMAN *In JPL Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc.* p 25-34 15 Jul. 1982

Avail: NTIS HC A15/MF A01 CSCL 10A

The development and testing of a rigid panel concept that utilizes a thin film reflective surface for application to a low-cost point-focusing solar concentrator is discussed. It is shown that a thin film reflective surface is acceptable for use on solar concentrators, including 1500 F applications. Additionally, it is shown that a formed steel sheet substrate is a good choice for concentrator panels. The panel has good optical properties, acceptable forming tolerances, environmentally resistant substrate and stiffeners, and adaptability to low to mass production rates. Computer simulations of the concentrator optics were run using the selected reflector panel design. Experimentally determined values for reflector surface specularity and reflectivity along with dimensional data were used in the analysis. The simulations provided intercept factor and net energy into the aperture as a function of aperture size for different surface errors and pointing errors. Point source and Sun source optical tests were also performed. M.G.

N83-10530*# E-Systems, Inc., Dallas, Tex. Energy Technology Center.

A TRANSMITTANCE-OPTIMIZED, POINT-FOCUS FRESNEL LENS SOLAR CONCENTRATOR

M. J. ONEILL, V. R. GOLDBERG, and D. B. MUZZY *In JPL Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc.* p 35-47 15 Jul. 1982 refs

Avail: NTIS HC A15/MF A01 CSCL 10A

The development of a point-focus Fresnel lens solar concentrator for high-temperature solar thermal energy system applications is discussed. The concentrator utilizes a transmittance-optimized, short-focal-length, dome-shaped refractive Fresnel lens as the optical element. This concentrator combines both good optical performance and a large tolerance for manufacturing, deflection, and tracking errors. The conceptual design of an 11-meter diameter concentrator which should provide an overall collector efficiency of about 70% at an 815 C (1500 F) receiver operating temperature and a 1500X geometric concentration ratio (lens aperture area/receiver aperture area) was completed. Results of optical and thermal analyses of the collector, a discussion of manufacturing methods for making the large lens, and an update on the current status and future plans of the development program are included. M.G.

N83-10531*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

THE SMALL COMMUNITY SOLAR THERMAL POWER EXPERIMENT

T. KICENIUK *In its* Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. p 49-52 15 Jul. 1982 Previously announced as N81-30544

Avail: NTIS HC A15/MF A01 CSCL 10B

the objectives and current status of the Small Community Solar Thermal Power Experiment are discussed. The adjustments in programs goals made in response to the changing emphasis in the area of solar energy in national policy are addressed. Planned fabrication and testing activities for the test bed concentrator, power conversion assembly, and control system are outlined. M.G.

N83-10532*# Ford Aerospace and Communications Corp., Newport Beach, Calif. Aeronutronic Div.

DEVELOPMENT STATUS OF THE SMALL COMMUNITY SOLAR POWER SYSTEM

R. L. PONS *In JPL* Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. p 53-99 15 Jul. 1982

Avail: NTIS HC A15/MF A01 CSCL 10B

The development status and test results for the Small Community Solar Thermal Power Experiment are presented. Activities on the phase 2 power module development effort are presented with emphasis on the receiver, the plant control subsystem, and the energy transport subsystem. The components include a single prototype power module consisting of a parabolic dish concentrator, a power conversion assembly (PCA), and a multiple-module plant control subsystem. The PCA consists of a cavity receiver coupled to an organic Rankine cycle engine-alternator unit defined as the power conversion subsystem; the PCA is mounted at the focus of a parabolic dish concentrator. At a solar insolation of 100 W/sq m and ambient temperature of 28 C (82 F), the power module produces approximately 20 kW of 3-phase, 3 kHz ac power, depending on the concentrator employed. A ground-mounted rectifier to the central collection site where it is supplied directly to the common dc bus which collects the power from all modules in the plant. M.G.

N83-10533*# Barber-Nichols Engineering Co., Arvada, Colo.
ORGANIC RANKINE POWER CONVERSION SUBSYSTEM DEVELOPMENT FOR THE SMALL COMMUNITY SOLAR THERMAL POWER SYSTEM

R. E. BARBER and F. P. BODA (Ford Aerospace and Communications Corp., Newport Beach, Calif.) *In JPL* Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. p 101-113 15 Jul. 1982

Avail: NTIS HC A15/MF A01 CSCL 10B

The development and preliminary test results for an air-cooled, hermetically sealed 20 kW sub E organic Rankine cycle engine/alternator unit for use with point focussing distributed receiver solar thermal power system. A 750 F toluene is the working fluid and the system features a high speed, single-stage axial flow turbine direct-coupled to a permanent magnet alternator. Good performance was achieved with the unit in preliminary tests. M.G.

N83-10534*# Applied Concepts Corp., Reston, Va.
VERIFICATION TESTING OF THE PKI COLLECTOR AT SANDIA NATIONAL LABORATORIES, ALBUQUERQUE, NEW MEXICO

J. S. HAUGER and S. L. POND *In JPL* Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. p 115-118 15 Jul. 1982

Avail: NTIS HC A15/MF A01 CSCL 10A

Verification testing of a solar collector was undertaken prior to its operation as part of an industrial process heat plant at Capitol Concrete Products in Topeka, Kansas. Testing was performed at a control plant installed at Sandia National Laboratory, Albuquerque, New Mexico (SNLA). Early results show that plant performance is even better than anticipated and far in excess of test criteria. Overall plant efficiencies of 65 to 80 percent were typical during hours of good insolation. A number of flaws and

imperfections were detected during operability testing, the most important being a problem in elevation drive alignment due to a manufacturing error. All problems were corrected as they occurred and the plant, with over 40 hours of operation, is currently continuing operability testing in a wholly-automatic mode R.J.F.

N83-10535*# Applied Concepts Corp., Reston, Va.
PKI SOLAR THERMAL PLANT EVALUATION AT CAPITOL CONCRETE PRODUCTS, TOPEKA, KANSAS

J. S. HAUGER and D. N. BORTON (Power Kinetics, Inc.) *In JPL* Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. p 119-121 15 Jul. 1982

Avail: NTIS HC A15/MF A01 CSCL 10B

A system feasibility test to determine the technical and operational feasibility of using a solar collector to provide industrial process heat is discussed. The test is of a solar collector system in an industrial test bed plant at Capitol Concrete Products in Topeka, Kansas, with an experiment control at Sandia National Laboratories, Albuquerque. Plant evaluation will occur during a year-long period of industrial utilization. It will include performance testing, operability testing, and system failure analysis. Performance data will be recorded by a data acquisition system. User, community, and environmental inputs will be recorded in logs, journals, and files. Plant installation, start-up, and evaluation, are anticipated for late November, 1981. R.J.F.

N83-10536*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

RECENT TESTS ON THE CARTER SMALL RECIPROCATING STEAM ENGINES

T. KICENIUK and W. WINGENBACH *In its* Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. p 123-145 15 Jul 1982 refs

Avail: NTIS HC A15/MF A01 CSCL 10B

The Jay Carter Enterprises (JCE) Paratransit Vehicle steam engine was tested over a range of conditions which might be experienced by the power converter subsystem of the Small Community Solar Thermal Power Experiment. Some difficulties were encountered getting the engine ready for testing. These difficulties were related to the five year dormancy of the entire system and to incomplete development work that had been going on at the time of cessation of steam engine work at JCE. Other difficulties were related to the fact that the particular expander being tested never ran before and possessed some manufacturing defects. Nevertheless, the engine was operated successfully and results of testing do verify results of computer simulations of the engine in regard to the effect of temperature and power level variations. Engine efficiency was good but generally lower than expected and performance dropped as testing continued. The effect of change in expansion ratio was not demonstrated because of deterioration in engine performance. Post-test inspection revealed numerous correctable defects. R.J.F.

N83-10537*# Mechanical Technology, Inc., Latham, N. Y.
A 400-KWE HIGH-EFFICIENCY STEAM TURBINE FOR INDUSTRIAL COGENERATION

H. M. LEIBOWITZ *In JPL* Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. p 147-177 15 Jul 1982

Avail: NTIS HC A15/MF A01 CSCL 10B

An advanced state-of-the-art steam turbine-generator developed to serve as the power conversion subsystem for the Department of Energy's Sandia National Laboratories' Solar Total-Energy Project (STEP) is described. The turbine-generator, which is designed to provide 400-kW of net electrical power, represents the largest turbine-generator built specifically for commercial solar-powered cogeneration. The controls for the turbine-generator incorporate a multiple, partial-arc entry to provide efficient off-design performance, as well as an extraction control scheme to permit extraction flow regulation while maintaining 110-psig pressure. Normal turbine operation is achieved while synchronized to a local utility and in a stand-alone mode. In both cases, the turbine-generator features automatic load control as well as remote start-up and shutdown capability. Tests totaling 200 hours were

02 SOLAR ENERGY

conducted to confirm the integrity of the turbine's mechanical structure and control function. Performance tests resulted in a measured inlet throttle flow of 8,450 pounds per hour, which was near design conditions. R.J.F.

N83-10538*# KB United Stirling AB & Co., Malmö (Sweden) MODIFICATIONS AND TESTING OF A 4-95 STIRLING ENGINE FOR SOLAR APPLICATIONS

H. G. NELVING and W. H. PERCIVAL (United Stirling, Inc.) /in JPL Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. p 179-189 15 Jul. 1982
Avail: NTIS HC A15/MF A01 CSCL 10B

The modifications and testing of a standard Stirling engine, required for connection to a 25 kW induction alternator, for use with a solar thermal parabolic dish electric module is described. Power was absorbed by a GE induction alternator connected to the utility grid. Also included are the results from recent testing of another solar engine at the DOE-Georgia Tech solar site. It was done in parallel with the testing at Edwards for the purpose of comparing performance of two solar-only receivers, which were based on the standard 4-95 involute heat exchanger. R.J.F.

N83-10539*# Advanco Corp., El Segundo, Calif. DISH STIRLING SYSTEM INTEGRATION AND TEST PROGRESS REPORT

R. A. HAGLUND /in JPL Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. p 191-200 15 Jul. 1982
Avail: NTIS HC A15/MF A01 CSCL 10B

The integration and check-out of a complete Dish Solar Stirling Thermal Power System is described. The preliminary results of the tests conducted thus far are presented. The results are very encouraging and show promise of high performance and efficiency. The outstanding performance and durability of the 4-95 Stirling engine was the highlight of this 6 month integration and test activity. Exposure to severe heat, dust, sand and wind during the summer months and heavy rains, high winds, including sand storms and freezing cold in recent months did not affect the engine or the receiver in any noticeable manner. R.J.F.

N83-10540*# Advanco Corp., El Segundo, Calif. COMMERCIALIZATION OF PARABOLIC DISH SYSTEMS

B. WASHOM /in JPL Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. p 201-205 15 Jul. 1982
Avail: NTIS HC A15/MF A01 CSCL 10B

The impact of recent federal tax and regulatory legislation on the commercialization of parabolic solar reflector technology is assessed. Specific areas in need of technical or economic improvement are noted. R.J.F.

N83-10541*# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).

A POINT FOCUSING COLLECTOR FOR AN INTEGRATED WATER/POWER COMPLEX

H. ZEWE, G. SCHMIDT, and S. MOUSTAFA (Kuwait Inst. for Scientific Research) /in JPL Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. p 207-223 15 Jul. 1982 refs
Translation was announced as N82-23149
Avail: NTIS HC A15/MF A01 CSCL 10B

The utilization potential of the point focusing parabolic dish is identified. Its main design parameters are summarized. Performance tests and the utilization of the collector as primary energy source in a food-water-power complex are described. Process heat, heat storage, heat transfer, and cogeneration are discussed. R.J.F.

N83-10542*# Centre National de la Recherche Scientifique, Marseilles (France). Dept. d'Héliophysique. THE FRENCH THERMO-HELIO-ELECTRICITY-KW PARABOLIC DISH PROGRAM

M. AUDIBERT and G. PERI /in JPL Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. p 225-231 15 Jul. 1982
Avail: NTIS HC A15/MF A01 CSCL 10B

The testing and development of parabolic dish solar thermal power plants to produce, thermal mechanical, or electrical energy

are discussed. The design, construction, and experiments of prototype collectors to prove the feasibility of such collectors is described. R.J.F.

N83-10543*# AiResearch Mfg. Co., Torrance, Calif. HIGH-TEMPERATURE CERAMIC HEAT EXCHANGER ELEMENT FOR A SOLAR THERMAL RECEIVER

H. J. STRUMPF, D. M. KOTCHICK, and M. G. COOMBS /in JPL Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. p 233-246 15 Jul. 1982 refs
Avail: NTIS HC A15/MF A01 CSCL 10A

A study was performed by AiResearch Manufacturing Company, a division of The Garrett Corporation, on the development of a high-temperature ceramic heat exchanger element to be integrated into a solar receiver producing heated air. A number of conceptual designs were developed for heat exchanger elements of differing configuration. These were evaluated with respect to thermal performance, pressure drop, structural integrity, and fabricability. The final design selection identified a finned ceramic shell as the most favorable concept. The shell is surrounded by a larger metallic shell. The flanges of the two shells are sealed to provide a leak-tight pressure vessel. The ceramic shell is to be fabricated by an innovative combination of slip casting the receiver walls and precision casting the heat transfer finned plates. The fins are bonded to the shell during firing. The unit is sized to produce 2150 F air at 2.7 atm pressure, with a pressure drop of about 2 percent of the inlet pressure. This size is compatible with a solar collector providing a receiver input of 85 kw(th). Fabrication of a one-half scale demonstrator ceramic receiver has been completed. B.W.

N83-10544*# Sanders Associates, Inc., Nashua, N. H. CERAMIC HIGH TEMPERATURE RECEIVER DESIGN AND TESTS

S. B. DAVIS /in JPL Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. p 247-255 15 Jul. 1982
Avail: NTIS HC A15/MF A01 CSCL 10B

The High Temperature Solar Thermal Receiver, which was tested at Edwards AFB, CA during the winter of 1980-1981, evolved from technologies developed over a five year period of work. This receiver was tested at the Army Solar Furnace at White Sands, NM in 1976. The receiver, was tested successfully at 1768 deg F and showed thermal efficiencies of 85%. The results were sufficiently promising to lead ERDA to fund our development and test of a 250 kW receiver to measure the efficiency of an open cavity receiver atop a central tower of a heliostat field. This receiver was required to be design scalable to 10, 50, and 100 MW-electric sizes to show applicability to central power tower receivers. That receiver employed rectangular silicon carbide panels and vertical stanchions to achieve scalability. The construction was shown to be fully scalable; and the receiver was operated at temperatures up to 2000 deg F to achieve the performance goals of the experiment during tests at the GIT advanced components test facility during the fall of 1978. B.W.

N83-10545*# Garrett Turbine Engine Co., Phoenix, Ariz. GARRETT SOLAR BRAYTON ENGINE/GENERATOR STATUS

B. ANSON /in JPL Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. p 257-282 15 Jul. 1982
Avail: NTIS HC A15/MF A01 CSCL 10B

The solar advanced gas turbine (SAGT-1) is being developed by the Garrett Turbine Engine Company, for use in a Brayton cycle power conversion module. The engine is derived from the advanced gas turbine (AGT101) now being developed by Garrett and Ford Motor Company for automotive use. The SAGT Program is presently funded for the design, fabrication and test of one engine at Garrett's Phoenix facility. The engine when mated with a solar receiver is called a power conversion module (PCU). The PCU is scheduled to be tested on JPL's test bed concentrator under a follow on phase of the program. Approximately 20 kw of electrical power will be generated. B.W.

N83-10546*# AiResearch Mfg. Co., Los Angeles, Calif.
APPLICATION OF THE SUBATMOSPHERIC ENGINE TO SOLAR THERMAL POWER

In JPL Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. p 283-293 15 Jul. 1982

Avail: NTIS HC A15/MF A01 CSCL 10B

The development of a natural gas-fired Brayton engine is discussed. It is intended to be the prime mover for a 10-ton commercial heat pump. This engine has many attractive features that make it an ideal candidate for solar thermal-power generation applications. The unique feature of this engine is its subatmospheric mode of operation. It operates between atmospheric pressure and a partial vacuum. This means that heat is added to the cycle at atmospheric pressure; this permits the receiver to be unpressurized, greatly simplifying its design and cost. B.W.

N83-10548*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

CONFIGURATION SELECTION STUDY FOR ISOLATED LOADS USING PARABOLIC DISH MODULES

W. REVERE, J. BOWYER, T. FUJITA, and H. AWAYA *In its* Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. p 319-328 15 Jul. 1982 refs Previously announced as A82-18223

Avail: NTIS HC A15/MF A01 CSCL 10B

A configuration tradeoff study was conducted to determine optimum solar thermal parabolic dish power systems for isolated load applications. The specific application of an essentially constant power demand as required for MX missile shelters is treated. Supplying a continuous level of power with high reliability is shown to require a power system comprising modular parabolic dish power units where the heat engines of the modular power units can be driven by fossil fuels as well as solar-derived heat. Since constraints on reliability result in the provision of a power generating capability that exceeds the constant demand level, efficient utilization of the power system requires battery storage. Tradeoffs regarding the optimum size of storage are investigated as a function of the number of power modules and the cost of the fossil fuel B.W.

N83-10549*# Solar Steam, Inc., Fox Island, Wash.

AN ECONOMIC EVALUATION OF SOLAR ENERGY

D. WOOD *In* JPL Parabolic Dish Solar Thermal Ann. Program Rev., Proc. p 329-338 15 Jul. 1982 Previously announced as A78-10615

Avail: NTIS HC A15/MF A01 CSCL 10A

The economic advantages of solar dish collectors are evaluated and compared with other energy systems. Labor, inflation and energy deregulation are considered. B.W.

N83-10552*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

USER HANDBOOK FOR BLOCK IV SILICON SOLAR CELL MODULES

M. I. SMOKLER 1 Sep. 1982 63 p refs

(Contract NAS7-100)

(NASA-CR-169431; DOE/JPL-1012-75; JPL-PUB-82-73; NAS 1.26:169431) Avail: NTIS HC A04/MF A01 CSCL 10A

The essential electrical and mechanical characteristics of block 4 photovoltaic solar cell modules are described. Such module characteristics as power output, nominal operating voltage, current-voltage characteristics, nominal operating cell temperature, and dimensions are tabulated. The limits of the environmental and other stress tests to which the modules are subjected are briefly described. M.G.

N83-10553*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

PHOTOVOLTAIC MODULE ENCAPSULATION DESIGN AND MATERIALS SELECTION, VOLUME 1, ABRIDGED

E. CUDDIHY 1 Sep. 1982 40 p refs

(Contract NAS7-100; DE-AI01-76ET-20356; JPL PROJ. 5101-216) (NASA-CR-169372; DOE/JPL-1012-77-VOL-1;

JPL-PUB-82-81-VOL-1; NAS 1.26:169372) Avail: NTIS HC A03/MF A01 CSCL 10A

A summary version of Volume 1, presenting the basic encapsulation systems, their purposes and requirements, and the characteristics of the most promising candidate systems and materials, as identified and evaluated by the Flat-Plate Solar Array Project is presented. In this summary version considerable detail and much supporting and experimental information has necessarily been omitted. A reader interested in references and literature citations, and in more detailed information on specific topics, should consult Reference 1, JPL Document No. 5101-177, JPL Publication 81-102, DOE/JPL-1012-60 (JPL), June 1, 1982. Author

N83-10554*# National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio.

THE EFFECT OF TA2O5 ON THE INTERACTION BETWEEN SILICON AND ITS CONTACT METALLIZATION

V. G. WEIZER 1982 10 p refs Presented at the 16th Photovoltaic Specialists Conf., San Diego, Calif., 23 Sep. 1982; sponsored by IEEE

(NASA-TM-82948; E-1354; NAS 1.15:82948) Avail: NTIS HC A02/MF A01 CSCL 10A

Evidence is presented showing that the presence of the commonly used antireflection coating material, Ta2O5, on the free surface of contact metallization can either suppress or enhance, depending on the system, the interaction that takes place at elevated temperatures between the metallization and the underlying silicon. The Ta2O5 layer is shown to suppress both the generation and the annihilation of vacancies at the metal free surface which are necessary to support metal-silicon interactions. It is also shown that the mechanical condition of the free metal surface has a significant effect on the passivating ability of the Ta2O5 layer. Author

N83-10555*# National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio.

EVALUATION OF ELECTRODE SHAPE AND NONDESTRUCTIVE EVALUATION METHOD FOR WELDED SOLAR CELL INTERCONNECTS

C. R. BARAONA, S. J. KLIMA, T. J. MOORE, W. E. FREY, and A. F. FORESTIERI 1 Sep. 1982 14 p refs Presented at 16th Photovoltaic Specialists Conf., San Diego, Calif., 27-30 Sep. 1982; sponsored by IEEE

(NASA-TM-82966; E-1386; NAS 1.15:82966) Avail: NTIS HC A02/MF A01 CSCL 10A

Resistance welds of solar cell interconnect tabs were evaluated. Both copper-silver and silver-silver welds were made with various heat inputs and weld durations. Parallel gap and annular gap weld electrode designs were used. The welds were analyzed by light microscope, electron microprobe and scanning laser acoustic microscope. These analyses showed the size and shape of the weld, the relationship between the acoustic micrographs, the visible electrode footprint, and the effect of electrode misalignment. The effect of weld heat input on weld microstructure was also shown. Author

N83-10564 Missouri Univ., Columbia.

THE FABRICATION AND EVALUATION OF A SILICON PHOTOVOLTAIC CELL WITH A DIRECTLY NITRIDED TUNNEL INSULATOR Ph.D. Thesis

W. F. RICHARDSON 1981 84 p

Avail: Univ. Microfilms Order No. DA8205416

The fabrication of MIS solar cells with nitrided insulator films is described. A technique for low temperature growth of the insulator film by direct nitridation in active nitrogen generated by electric discharge is presented. This film is found to be very smooth and

02 SOLAR ENERGY

its thickness is nearly independent of the active nitrogen exposure time. Cell performance is a strong function of exposure time and a film densification growth mechanism is proposed. The nitrided cells were empirically optimized for energy conversion performance and characterized according to Schottky barrier diode theory. Physical constants governing cell operation are obtained from current voltage and capacitance voltage measurements. Active area conversion efficiencies are nominally 8 percent as compared to 8 1/2 percent nominal efficiency for similarly fabricated cells with thermally grown silicon oxide insulators. Quantum efficiencies under monochromatic illumination in the visible spectrum are shown to be higher than those of junction type cells. Dissert. Abstr.

N83-10565 Florida Univ., Gainesville.
METHODS FOR INVESTIGATING THE PROPERTIES OF POLYCRYSTALLINE SILICON P-N JUNCTION SOLAR CELLS
Ph.D. Thesis

J. A. MAZER 1981 153 p

Avail: Univ Microfilms Order No. DA8203696

Experimental and analytical methods are developed for investigating the properties and performance degrading mechanism of polycrystalline silicon p-n junction solar cells. The degrading effects of areal inhomogeneity are demonstrated by means of a parallel subcell equivalent circuit model. It is shown that it is the area of the poor quality material in a silicon p-n junction solar cell that dominates in determining the overall cell performance. An experimental method is developed for assessing the validity of the shifting approximation for solar cells made from polysilicon and other material. The experimental data suggest that the shifting approximation is valid for a variety of polysilicon solar cells in which the intragrain base minority carrier diffusion length is small than or equal to the average grain diameter. The current components associated with the grain boundaries of diffused p-n junction polysilicon solar cells made on Wacker substrates are analyzed and experimentally identified. Dissert. Abstr.

N83-10567* New Mexico Univ., Albuquerque. Bureau of Engineering Research.

STUDY OF THE PHOTOVOLTAIC EFFECT IN THIN FILM BARIUM TITANATE Semiannual Report

W. W. GRANNEMANN and V. S. DHARMADHIKARI Oct. 1982 23 p refs

(Contract NAG1-95)

(NASA-CR-169435; NAS 1.26:169435;

EECE-274(82)-NASA-931-1) Avail: NTIS HC A02/MF A01

CSC 10A

The basic mechanism associated with the photovoltaic phenomena observed in the R.F. sputtered BaTiO₃/silicon system is presented. Series of measurements of short circuit photocurrents and open circuit photovoltage were made. The composition depth profiles and the interface characteristics of the BaTiO₃/silicon system were investigated for a better understanding of the electronic properties. A Scanning Auger Microprobe combined with ion in depth profiling were used. S.L.

N83-10597# General Electric Co., Philadelphia, Pa. Advanced Energy Programs Dept.

DESIGN AND DEVELOPMENT OF A HIGH-CONCENTRATION PHOTOVOLTAIC CONCENTRATOR

R. C. HODGE Apr. 1982 112 p refs

(Contract DE-AC04-76DP-00789)

(DE82-015673; SAND-81-7007) Avail: NTIS HC A06/MF A01

The design and development of a high concentration photovoltaic concentrator module is discussed. The design concept incorporating a curved groove domed Fresnel lens, a high concentration etched multiple vertical junction solar cell and a passively cooled direct-bonded copper cell mount all packaged in a plastic module is discussed. Two seven inch diameter 1200x domed Fresnel lenses were fabricated using single point diamond turning technology. Testing confirmed optical transmission efficiencies of over 83%. Samples of the latest available cells were mounted and installed, with a domed Fresnel lens, into a prototype module. Subsequent testing demonstrated net lens-cell

efficiencies of 10 to 13%. Salient conclusions were formulated as to this technology. DOE

N83-10598# Sandia Labs., Albuquerque, N. Mex. Experimental Facilities Operations Div.

RESULTS OF TESTING A DEVELOPMENT MODULE OF THE SECOND-GENERATION E-SYSTEMS CONCENTRATING PHOTOVOLTAIC-THERMAL MODULE

T. D. HARRISON Apr. 1982 25 p

(Contract DE-AC04-76DP-00789)

(DE82-015671; SAND-82-0701) Avail: NTIS HC A02/MF A01

An actively-cooled linear Fresnel lens concentrating photovoltaic and thermal module, designed and built by E-Systems, was tested in the Photovoltaic Advanced Systems Test Facility. Physical, electrical, and thermal characteristics of the module are presented. Module performance is characterized through the use of multiple linear regression techniques. DOE

N83-10599# Sandia Labs., Livermore, Calif. Solar Programs Div.

DESIGNING THE MANIFOLD PIPING FOR PARABOLIC-TROUGH-COLLECTOR FIELDS

J. K. SHARP Apr. 1982 28 p refs

(Contract DE-AC04-76DP-00789)

(DE82-015998; SAND-81-1780) Avail: NTIS HC A03/MF A01

A simple procedure for sizing the manifold piping in parabolic-trough collector fields is presented. The proper manifold pipe sizes and insulation thicknesses are obtained without detailed optimizations of the thermal and electrical parasitics. An engineering constraint determines the pipe sizes and an insulation table lists the proper insulation thicknesses. The engineering constraint limits the pressure drop in the manifold piping to a fraction of the pressure drop in the (RADICAL)T string. This ensures output temperature control in all (RADICAL)T strings. A four-step procedure is presented to size the manifold piping; tables showing the proper insulation thickness as a function of pipe size and temperature are given. DOE

N83-10605# Total Environmental Action, Inc., Harrisville, N.H.
STUDY OF PHOTOVOLTAIC RESIDENTIAL RETROFITS. VOLUME 1: EXECUTIVE SUMMARY

D. E. MAHONEY, P. I. TEMPLE, J. A. ADAMS, B. B. CHALMERS, A. E. MOTTER, and A. E. MILLNER Apr. 1982 84 p 3 Vol.

(Contract DE-AC04-76DP-00789)

(DE82-015793; SAND-81-7019/1) Avail: NTIS HC A05/MF A01

The problems and potentials are analyzed for widespread residential retrofits of PV power systems. Included are data on the existing housing stock, designs for array mounting and system electrical wiring, and economic analyses for retrofits. DOE

N83-10607# Boeing Computer Services, Inc., Seattle, Wash.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE REPORT. VOLUME 7: BEVERLY HIGH SCHOOL, BEVERLY, MASS.

Apr. 1982 30 p

(Contract DE-AC04-76DP-00789)

(DE82-015790; SAND-81-7088/7) Avail: NTIS HC A03/MF A01

Performance data are given for a grid-connected photovoltaic power supply at a Massachusetts high school for the month of March, 1982. Data presented include: daily and monthly electrical energy produced; daily and monthly array efficiency; energy produced as a function of power level, voltage, cell temperature, and hour of the day; power conditioner input, output, and efficiency for two power conditioner units and for the overall power conditioning system; daily and monthly photovoltaic energy to load and the corresponding dollar value, and to load energy from February 17 through April 5; photovoltaic system efficiency; capacity factor; daily system availability; daily and hourly insolation; heating and cooling degree days; hourly and monthly ambient temperature; hourly and monthly wind speed; wind direction distribution; number of freeze/thaw cycles; hourly cell temperature; and data acquisition mode and recording interval plot. Also included are seven summaries of site events. DOE

N83-10608# Boeing Computer Services, Inc., Seattle, Wash.
**INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION
 EXPERIMENT OPERATIONAL PERFORMANCE. VOLUME 6
 FOR LOVINGTON SQUARE SHOPPING CENTER, LOVINGTON,
 NM**

Jan. 1982 8 p

(Contract DE-AC04-76DP-00789)

(DE82-015476; SAND-81-7099/6) Avail: NTIS HC A02/MF A01

Performance data are presented for a 100 kW-peak grid connected flat panel photovoltaic power supply at a New Mexico shopping center for the month of December 1981. Data include daily and monthly electrical energy produced, daily and monthly incident solar energy in the array plane, efficiency of the array and of the power conditioner, capacity factor, insolation, and the data acquisition mode and recording interval plot. Also included is a site event report involving the operating data acquisition system.

DOE

N83-10610# Sandia Labs., Albuquerque, N Mex. Thermophysical Properties Div.

**SOLAR HEMISPHERICAL REFLECTOMETER MODIFICATION
 FOR SECOND-SURFACE MIRROR MEASUREMENT**

A. R. MAHONEY May 1982 28 p refs

(Contract DE-AC04-76DP-00789)

(DE82-016913; SAND-82-0934) Avail: NTIS HC A03/MF A01

A commercial reflectometer has been modified for improved measurement of the solar hemispherical reflectance of second surface mirrors. The Solar Spectrum Reflectometer (SSR), manufactured by Devices and Services Co., Dallas, TX is designed to measure the solar hemispherical reflectance of flat, diffusely reflecting and first surface specular samples. Initial investigation of the device revealed that the SSR yielded significant deviations from the actual solar reflectance of second surface mirrors. The low reflectance values were determined to be caused by the displacement of the reflective surface away from the measurement port caused by the mirror protective layer. Instrument modifications are described which reduce the sensitivity of the instrument to second surface mirror thickness. The modifications involve enlarging both the sample port opening and the specular disk (target) located inside the measurement cavity, adjusting the lamp assembly height, and installing a diffuser over the lamp. The modified SSR demonstrated only a small linear reflectance variation with mirror displacement. It was shown that any mirror of known solar hemispherical reflectance having a thickness within the range, 0 mm (first surface) to 3.2 mm, could be used as the reflectance standard.

DOE

N83-10620# Battelle Inst., Frankfurt am Main (West Germany). Abt. Angewandte Festkoerperphysik.

**RESEARCH AND DEVELOPMENT ON A MIS THIN FILM SOLAR
 CELL MADE OF AMORPHOUS SILICON Final Report, Jan.
 1981**

H. JAEGER, D. BONNET, W. ROESSLER, U. BRUNSMANN, and B. FUESSL Bonn Bundesministerium fuer Forschung und Technologie Jun. 1981 81 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-079; ISSN-0340-7608; R-64.125) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 17

The sputter deposition of a-Si : H layers was investigated, using a magnetron Si cathode. This allows working at much lower dc voltages, which is advantageous for the quality of the films. The photovoltaic characteristic of the layer is considered the crucial property and guide for the development. Photovoltaic barriers were mainly Au Schottky barriers. First structures yielded open circuit voltages of up to 570 mV and short circuit current densities of 1 mA/cm squared. Several possible improvements of the layer quality are proposed.

Author (ESA)

N83-10621# Fraunhofer-Inst. fuer Angewandte Festkoerperphysik, Freiburg (West Germany).

**SOLAR ENERGY CONVERSION BASED ON THE PRINCIPLE
 OF FLUORESCENT COLLECTORS Final Report, Oct. 1980**

G. BAUR, A. GOETZBERGER, K. HEIDER, H. LANGHALS, E. SAH, V. WITTEW, and A. ZASTROW Bonn Bundesministerium fuer Forschung und Technologie Jun. 1982 204 p refs In GERMAN, ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-081; ISSN-0340-7608) Avail: NTIS HC A10/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 39

Fluorescent dyes and matrix materials were investigated with regard to an application in fluorescent collectors. In the visible range, dyes from the field of display applications were available. In this spectral range, the combination organic dye - plexiglass gives satisfactory results concerning efficiency as well as stability. The first collectors were tested in a long term outdoor test setup. In the red and infrared range, the properties of dyes and collectors are not yet satisfactory.

Author (ESA)

N83-10622# Schott Glaswerke, Mainz (West Germany).

**DEVELOPMENT OF LARGE SCALE PRODUCTION METHODS
 FOR COMPONENTS OF SOLAR ENERGY COLLECTION.
 TRANSPARENT GLASS COVERS AND THEIR CONNECTION TO
 THE COLLECTOR SYSTEM Final Report, Mar. 1980**

E. HUSSMANN Bonn Bundesministerium fuer Forschung und Technologie Jun 1982 52 p refs In GERMAN, ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-083; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 11

The problems connected with the glass cover of flat solar collectors to be produced on a large scale are identified and solved. The glass pane cover of flat plate solar collectors and its connection to the collector can be selected only when all the mechanical and thermal stresses are known during operation. Loads from the environment as wind, snow, ice and hail were investigated. The loads due to operation as pressure rise related to temperature rise and thermal stresses are analyzed. The connection between glass panes and collector, cementing and fastening into a frame, were investigated. The effective strength of glass panes, thermally strengthened and not strengthened, is described extensively. These methods to calculate and predict the stresses in the cover plate and its connection to the collector are demonstrated by an example.

Author (ESA)

N83-10626# Maschinenfabrik Augsburg-Nuernberg A.G., Munich (West Germany). Abteilung EPS.

**TESTS WITH CONCENTRATING COLLECTORS Final Report,
 Jun. 1981**

M. KRAFT Bonn Bundesministerium fuer Forschung und Technologie Jul. 1982 82 p refs In GERMAN, ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-104; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 17

The parabolic solar absorber Helioman 3-32/A was developed. Before going over to industrial use in large solar plants, a complete module with all auxiliary equipment was tested. The standards for acceptability and quality were established, a module of six absorbers with tracking and automatic control systems was constructed, simulation tests were conducted, and real conditions tests were run at a solar energy test center. The results of simulation tests, the calculation of foundations, the choice of the reflector material, the starting-up procedure, and the running conditions are reported.

Author (ESA)

02 SOLAR ENERGY

N83-10632# Konstanz Univ. (West Germany). Fakultät fuer Physik.

INVESTIGATION OF NEW SOLAR CELLS. PART A: NOVEL SEMICONDUCTORS AND THEIR SUITABILITY. PART B: POLYCRYSTALLINE MIS DIODES Final Report, Dec. 1980

E. BUCHER and P. MUNZ Bonn Bundesministerium fuer Forschung und Technologie Jul. 1982 32 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-T-82-103, ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 6,50

Solar cells were explored with Be, Yb, Sc, Y, Hf as barrier metals; Sc proved to be the best one. For the first time, a surface as large as three and a quarter sq.cm. was obtained. It was proved that n-Si and n-Si/SiO₂ MIS cells with Au and Pt were inferior to p-type cells. Sintering of Si powder wafers was achieved by capacitor discharge. Photovoltaic materials as Zn₃P₂, WSe₂, InSc were explored. Production of solar cells by MIS technology-Si-powder-cells and metallurgy methods were studied. No stable cells are yet found due to chemical surface problems. Barrier metals such as Be, Sc, Hf and related elements can be used for p-Si MIS cells with good performances. They are considerably more stable than n-Si cells. Among alternative materials, p-WSe₂ appears to be the most promising material for p/n MIS and photoelectrochemical cells. Author (ESA)

N83-10718# Technische Hochschule, Darmstadt (West Germany). Inst. fuer Meteorologie.

DETERMINATION OF CLIMATOLOGICAL PARAMETERS OF GLOBAL RADIATION AND DIRECT SOLAR RADIATION FOR HORIZONTAL, NOT HORIZONTAL, FIXED AND NORMAL INCIDENT RADIATION ABSORBER Final Report, Jan. 1980

G. MANIER and H. FUCHS Bonn Bundesministerium fuer Forschung und Technologie May 1982 36 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-T-82-070; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 7,50

Solar radiation data were gathered. The data acquisition system consisted of five horizontal receivers, four inclined receivers, two tracking receivers, and one solar radiation indicator. Meteorological parameters were cloud cover, altitude of lower cloud cover, type of weather conditions. Half hourly sums of global, diffuse and direct solar radiation as well as the time percentage of direct solar radiation, the number, mean duration, and scatter of sunshine periods as calculated by computer. The investigations on the relationship between direct and diffuse solar radiation and synoptic weather observations were extrapolated on measurements taken over 8 years. The differences between measured and calculated monthly radiation sums are always smaller than 0.5 kWh/m². Author (ESA)

N83-10902 California Inst. of Tech., Pasadena.

THE LUMINESCENT SOLAR CONCENTRATOR Ph.D. Thesis

J. S. BATCHELDER 1982 286 p
Avail: Univ. Microfilms Order No. DA820334

The luminescent solar concentrator (LSC) allows sunlight to be concentrated through the use of light pipe trapping of luminescence. Such concentrators do not require tracking, and they can reduce the cost of solar energy conversion by reducing the required area of photovoltaic cells. The spectral characteristics of 18 organic laser dyes are studied for their applicability as luminescing centers. The spectral homogeneity and self absorption characteristics of representative dyes are examined. The relative spectral homogeneity of such dyes is shown to depend upon the surrounding material using narrow band laser excitation. Three independent techniques for measuring self absorption rates are developed; these are time resolved emission, steady state polarization anisotropy, and spectral convolution. Prototype devices are tested for performance, and the component dyes are tested for stability to solar exposure. Dissert. Abstr.

N83-10962*# National Aeronautics and Space Administration Lewis Research Center, Cleveland, Ohio.

RADIATION DAMAGE IN FRONT AND BACK ILLUMINATED HIGH RESISTIVITY SILICON SOLAR CELLS

I. WEINBERG, C. GORADIA, C. K. SWARTZ, and H. W. BRANDHORST, JR. 1982 12 p refs Presented at 16th Photovoltaic Specialists Conf., San Diego, Calif., 27-30 1982; sponsored by IEEE

(NASA-TM-82965; E-1384; NAS 1.15:82965) Avail: NTIS HC A02/MF A01 CSCL 10A

Radiation induced degradation, in front and back illuminated 84 and 1250 ohm-cm n+pp+ silicon solar cells, was determined and cell performance interpreted using calculated optically injected charge distributions and cell voltage components. The 84 ohm-cm cell degraded less when illuminated from the front or n+ side compared to that when illuminated from the back or p+ side. On the other hand, the 1250 ohm-cm cell degraded less when back illuminated. It is concluded that, in addition to the usual mechanisms leading to decreased collection efficiencies, loss of conductivity modulation is a major cause of radiation damage in high resistivity silicon solar cells. These results suggest that radiation damage to high resistivity n+pp+ cells can be decreased by increasing cell collection efficiency and illuminating the cells from the p+ side.

Author

N83-11585# Sandia Labs., Albuquerque, N. Mex.

EFFICIENCY-IMPROVEMENT STUDY FOR GAAS SOLAR CELLS Final Report, 31 Mar. 1980 - 30 Sep. 1981

J. A. CAPE, J. R. OLIVER, and S. W. ZEHR Apr. 1982 178 p refs Prepared in cooperation with Rockwell International Corp., Thousand Oaks, Calif.

(Contract DE-AC04-76DP-00789)

(DE82-016410; SAND-82-7105) Avail: NTIS HC A09/MF A01

High yield fabrication of good quality AlGaAs/GaAs concentration solar cells has been a limiting factor in widespread utilization of these high conversion efficiency (22 to 24%) photovoltaic cells. Reported is a series of investigations to correlate solar cell yield with substrate quality, growth techniques, layer composition, and metallization processes. In addition, several diagnostic techniques are described to aid in device characterization. DOE

N83-11586# Pacific Northwest Lab., Richland, Wash.

EVALUATION OF SOLAR-AIR-HEATING CENTRAL-RECEIVER CONCEPTS

S. P. BIRD, M. K. DROST, T. A. WILLIAMS, D. R. BROWN, J. A. FORT, B. A. GARRETTPRICE, S. G. HAUSER, M. A. MCLEAN, A. M. PALUSZEK, and J. K. YOUNG Jun. 1982 140 p refs (Contract DE-AC06-76RL-01830)

(DE82-016924; PNL-4003) Avail: NTIS HC A07/MF A01

The potential of seven proposed air-heating central receiver concepts are evaluated based on an independent, uniform of each one's performance and cost. The concepts include metal tubes, ceramic tubes, sodium heat pipes, ceramic matrix, ceramic domes, small particles, and volumetric heat exchange. The selection of design points considered in the analysis, the method and ground rules used in formulating the conceptual designs are discussed, and each concept design is briefly described. The method, ground rules, and models used in the performance evaluation and cost analysis and the results are presented. DOE

N83-11588# Boeing Computer Services, Inc., Seattle, Wash.

INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE REPORT. VOLUME 10. NEWMAN POWER STATION, EL PASO, TEX.

Apr. 1982 23 p

(Contract DE-AC04-76DP-00789)

(DE82-015791; SAND-81-7086/10) Avail: NTIS HC A02/MF A01

Performance data are presented for a photovoltaic power supply at a Texas utility for the month of March, 1982. Data given include: daily and monthly electrical energy produced; daily and monthly solar energy incident in the array plane; daily and monthly efficiency;

energy production as a function of power level, voltage, cell temperature, and hour of the day; daily and monthly photovoltaic power to the load and the corresponding dollar value; capacity factor; daily availability; daily and hourly insolation; daily and hourly ambient temperature; daily and hourly wind speed; wind direction distribution; hourly cell temperature; heating and cooling degree days; number of freeze and thaw cycles; and data acquisition mode and recording interval plot. Also included is an operations and maintenance report summarizing two events DOE

N83-11589# Boeing Computer Services, Inc., Seattle, Wash
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENTAL OPERATIONAL PERFORMANCE REPORT. VOLUME 10. LOVINGTON SQUARE SHOPPING CENTER, LOVINGTON, N. MEX. (USA)
 Apr. 1982 29 p
 (Contract DE-AC04-76DP-00789)
 (DE82-015792; SAND-81-7085/10) Avail: NTIS HC A03/MF A01

Performance data are presented for a photovoltaic power supply at a New Mexico shopping center for the month of March, 1982. Data given include: daily and monthly electrical energy produced; daily and monthly solar energy incident in the array plane; daily and monthly efficiency; energy produced as a function of power level, voltage, cell temperature, and hour of the day; power conditioner input, output, and efficiency for two units and for the overall power conditioning system; daily and monthly photovoltaic energy supplied to the load and the corresponding dollar value, system efficiency; capacity factor; daily availability; daily and hourly insolation, ambient temperature, and wind speed; hourly cell temperature, wind direction distribution; heating and cooling degree days; number of freeze and thaw cycles, and the data acquisition mode and recording interval plot. Also included is a report of operation and maintenance for the month. DOE

N83-11598# Kernforschungsanlage, Juelich (West Germany).
PROTOTYPE SOLAR HOUSE. STUDY OF THE SCIENTIFIC EVALUATION AND FEASIBILITY OF A RESEARCH AND DEVELOPMENT PROJECT Final Report, Apr. 1981
 V. BUNDSCHUH, J. W. GRUETER, M. KLEEMANN, M. MELIS, H. J. STEIN, H. J. WAGNER, A. DITTRICH (Gesellschaft zur Foerderung der Heizungs- und Klimatechnik mbH), and D. POHLMANN (Gesellschaft zur Foerderung der Heizungs- und Klimatechnik mbH) Bonn Bundesministerium fuer Forschung und Technologie Aug. 1982 74 p refs In GERMAN, ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
 (BMFT-FB-T-82-137; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 15,50

A preliminary study was undertaken before a large scale project for construction and survey of about a hundred solar houses was launched. The notion of solar house was defined and the use of solar energy (hot water preparation, heating of rooms, heating of swimming pool, or a combination of these possibilities) were examined. A coherent measuring program was set up. Advantages and inconveniences of the large scale project were reviewed. Production of hot water, evaluation of different concepts and different fabrications of solar systems, coverage of the different systems, conservation of energy, failure frequency and failures statistics, durability of the installation, investment maintenance and energy costs were retained as study parameters. Different solar hot water production systems and the heat counter used for measurements are described. Author (ESA)

N83-11605# Swedish Council for Building Research, Stockholm.
DURABILITY OF SOLAR COLLECTORS: EXPERIENCE FROM SURVEYS OF SWEDISH SOLAR COLLECTOR INSTALLATIONS, 1979 - 1980

O. LAGERKVIST and H. WENNERHOLM 1982 64 p refs
 (PB82-188095, D1.1982; ISBN-91-540-3609-7) Avail: NTIS HC A04/MF A01 CSCL 13A

Solar heating installations were surveyed during the autumn of 1979 and spring of 1980, with a view to identifying damage occurring to solar collectors and problems related to their design and materials, and of attempting to ascertain the reasons therefore. The installations which were investigated were in operation for periods ranging from about a month to up to about five years.

GRA

N83-11608# National Bureau of Standards, Washington, D.C.
 Center for Building Technology.
SOLAR AVAILABILITY IN CITIES AND TOWNS: A COMPUTER MODEL Final Report
 K. RUBERG Mar. 1982 237 p refs
 (Contract DE-AI01-76PR-06010)
 (PB82-202201, NBSIR-82-2498) Avail: NTIS HC A11/MF A01 CSCL 10A

An interactive computer program, SOLITE, which was written to determine the incident solar radiation on urban building surfaces, street surfaces and rooms facing urban street canyons is discussed. Hourly weather data and surface descriptors are interactively entered by the user. Solar radiation data are calculated with NOAA weather tape (TMY or TRY) cloud data using the Kimura/Stephenson cloud cover algorithm. The SOLITE also calculates solar radiation transmission through user specified glazing assemblies. Shadows cast by surrounding buildings and overhangs and interreflection effects in street canyons are captured. Internal heat gains from occupants and lighting, and daylight availability on the workplane of a room are calculated. Output options include weather data summaries, incident insolation, occupant heat gain in rooms and useable hours of daylight in a room with a given occupancy. Either hourly or daily values may be specified as output. GRA

N83-12287# National Bureau of Standards, Washington, D.C.
 National Engineering Lab.
ANALYTICAL AND EXPERIMENTAL ANALYSIS OF PROCEDURES FOR TESTING SOLAR DOMESTIC HOT WATER SYSTEMS Final Report
 A. H. FANNEY, W. C. THOMAS, C. A. SCARBROUGH, and C. P. TERLIZZI Feb. 1982 161 p refs Prepared in cooperation with the Virginia Polytechnic Inst and State Univ. Sponsored in part by DOE
 (PB82-184839; NBS-BSS-140-LC-81-600191) Avail: NTIS HC A08/MF A01 CSCL 13A

Three experimental techniques which allow the net thermal output of an irradiated solar collector array to be reproduced indoors without the use of a solar simulator are investigated. These techniques include use of an electric heat source only, use of a nonirradiated collector array in series with an electric heat source, and the use of electric strip heaters which are attached to the back of nonirradiated absorber plates. Expressions are developed to compute the input power required for each experimental technique. Solar collectors connected in parallel and series combinations are considered. GRA

N83-12386# California Univ., Berkeley. Dept. of Mechanical Engineering.
INVESTIGATION OF FREE-FORCED CONVECTION FLOWS IN CAVITY-TYPE RECEIVERS Progress Report, 1 Oct. 1980 - 30 Sep. 1981

J. A. C. HUMPHREY, F. S. SHERMAN, K. S. CHEN, and W. M. TO Jul. 1982 15 p refs
 (Contract DE-AC04-76DP-00789)
 (DE82-020118; SAND-82-8190) Avail: NTIS HC A02/MF A01

A numerical calculation procedure applicable to cavity-type solar receiver configurations and flow conditions was developed. Air

02 SOLAR ENERGY

flow visualization experiments were performed, and experimental measurements of quantities valuable for the development of the numerical calculation procedure were made. The investigation is focussed on a configuration which is strongly two dimensional in the mean flow structure (but turbulent in a truly three dimensional sense). DOE

N83-12538# Automation Industries, Inc., Silver Spring, Md. Vitro Labs. Div

STEVENS HOME, RANCHO SANTA FE, CALIFORNIA: SOLAR-ENERGY-SYSTEM PERFORMANCE EVALUATION, OCT. 1981 - APR. 1982

P. E. WETZEL 1982 73 p refs

(Contract DE-AC01-79CS-30027)

(DE82-021698; SOLAR/1118-82/14) Avail: NTIS HC A04/MF A01

Performance data on a solar water heating system are given. The Stevens Home in California is a single family residence whose active solar energy system is designed to supply 70% of the hot water load. The system is equipped with 68 square feet of flat plate collectors, a 120 gallon solar preheat water tank, and a 40 gallon propane water heater. The solar fraction predicted by computer simulation and measured were the same, 44%. The system solar savings ratio, conventional fuel savings, and solar system coefficient of performance for the period covered are given. Monthly performance data are tabulated for the overall system and for the collector, storage, and domestic hot water subsystems. System operation is illustrated for a typical day by graphs of the temperatures at collector array, inlet and outlet, and at the preheat tank, and of water consumption. The typical operating sequence and solar energy use and heat losses are also graphed. DOE

N83-12539# Automation Industries, Inc., Silver Spring, Md. Vitro Labs. Div.

KALIN HOME, LONG ISLAND, NEW YORK: SOLAR-ENERGY-SYSTEM PERFORMANCE EVALUATION, SEP. 1981-MAR. 1982

B. D. HOWARD 1982 78 p refs

(Contract DE-AC01-79CS-30027)

(DE82-021701; SOLAR/1117-82/14) Avail: NTIS HC A05/MF A01

Performance data on a solar water heating system are given. The Kalin Home is a single family residence in East Meadow, Long Island, New York whose active solar energy system is designed to supply 60% of the hot water load. The system is equipped with 2 flat plate collectors with a combined area of 48 square feet and a 120-gallon tank for storage. Auxiliary heating is provided by a 4.5 kW single-element electric heater interfaced to off-peak power metering equipment to deliver auxiliary energy from midnight through 7:00 AM. Performance data for the total reporting period are summarized. In addition, monthly performance data are tabulated for the overall system and for the collector and domestic hot water subsystems. Predicted performance and performance measured during previous systems are also given for comparison. System operation for a typical day is illustrated by graphs of temperatures at various points in the system vs. time and by hourly water consumption graphs. A typical system operating sequence and solar energy utilization and heat losses are also graphed. (LEW) DOE

N83-12540# Automation Industries, Inc., Silver Spring, Md. Vitro Labs. Div.

EROS DATA CENTER, SIOUX FALLS, SOUTH DAKOTA: SOLAR-ENERGY-SYSTEM PERFORMANCE EVALUATION, OCT. 1981 - APR. 1982

P. E. WETZEL 1982 76 p refs

(Contract DE-AC01-79CS-30027)

(DE82-021703; SOLAR/2122-82/14) Avail: NTIS HC A05/MF A01

Performance data on a solar water heating system are given. The EROS Data Center in South Dakota is a government facility whose active solar energy system is equipped with 9124 square feet of flat plate collectors, 26,893 gallons of hot water storage in

an underground vault, and two auxiliary electric hot water boilers. The system provided 40% of the hot water load for the recording period. Other performance data for the period include the solar savings ratio, conventional fuel savings, system performance factor, and solar system coefficient of performance. Monthly performance data are tabulated for the system overall and for the collector and hot water subsystems. System operation for a typical day is illustrated by graphs of insolation and collector and storage temperatures versus time and of typical water consumption. The typical operating sequence is also graphed. GRA

N83-12543# Sandia Labs., Albuquerque, N. Mex.

INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE REPORT. VOLUME 3: BEVERLY HIGH SCHOOL, BEVERLY, MASSACHUSETTS

Dec. 1981 41 p refs

(Contract DE-AC04-76DP-00789)

(DE82-006236; SAND-81-7088-3) Avail: NTIS HC A03/MF A01

Software and hardware problems resulted in the loss of sixteen days of data during September. The total electrical energy produced by the PV system during September is listed as 3986 kWh. The meter is manually read only about every other month, but readings which bracket a majority of the days of the month of September indicate an average daily output of 220 kWh per day or 6600 kWh total for the month. Using the average inverter efficiency of 88 percent, shown in report Module 4, infers that the array produced 7500 kWh of dc output energy during September. Similar analysis for October, when data was collected for 26 of 31 days, infers that total system output for the full 31 days was approximately 6800 kWh rather than the recorded value of 5782 kWh. DOE

N83-12545# Pacific Northwest Lab., Richland, Wash.

A SURVEY OF SPECTRAL RESPONSE MEASUREMENTS FOR PHOTOVOLTAIC DEVICES

J. S. HARTMAN and M. A. LIND Nov. 1981 37 p refs

(Contract DE-AC06-76RLO-1830)

(DE82-006221; PNL-3970) Avail: NTIS HC A03/MF A01

A survey of the photovoltaic community was conducted to ascertain the present state-of-the-art for PV spectral response measurements. Specific topics explored included measurement system designs, good and bad features of the systems, and problems encountered in the evaluation of specific cell structures and materials. The survey showed that most spectral response data are used in diagnostic analysis for the optimization of developmental solar cells. Measurement systems commonly utilize a chopped narrowband source in conjunction with a constant bias illumination which simulates the ambient end use environment. Researchers emphasized the importance of bias illumination for all types of cells in order to minimize the effects of nonlinearities in cell response. Not surprisingly single crystal silicon cells present the fewest measurement problems to the researcher and were studied more thoroughly than any other type of solar cell. But, the accurate characterization of silicon cells is still difficult and laboratory intercomparison studies yielded data scatter ranging from + -5% to + -15%. DOE

N83-12547# Lincoln Lab., Mass. Inst. of Tech., Lexington.

J. F. LONG EXPERIMENTAL PHOTOVOLTAIC HOUSE Final Report

Jun. 1982 180 p Prepared in cooperation with Long (John F.) Properties, Inc

(Contract DE-AC02-76ET-20279)

(DE82-020506; DOE/ET-20279/201) Avail: NTIS HC A09/MF A01

A photovoltaic system was installed and monitored for one year at a three-bedroom, two-bath residence located in the suburbs of Phoenix, Arizona. The roof consists of 120 solar modules divided into five sub-arrays. The output is converted to ac and the system is grid-connected. The performance of the system overall, of the photovoltaic arrays, inverter, utility interface, and data acquisition system were measured and discussed. Public acceptance of the

system is also discussed. The system is illustrated, and performance data are extensively tabulated and graphed. DOE

N83-12548# General Electric Co., Philadelphia, Pa. Energy Systems and Technology Div.

ANALYSIS OF SMALL COMMERCIAL PHOTOVOLTAIC APPLICATIONS

J. HERZ, R. ALLRED, and R. MCCARTHY Jul. 1982 162 p refs

(Contract DE-AC04-76DP-00789)

(DE82-020924; SAND-81-7172) Avail: NTIS HC A08/MF A01

The objective was to determine promising small commercial (to 500 kW) grid connected photovoltaic applications. Twelve applications were evaluated, including detailed performance and economic analyses covering different collector types, utility rate structures and geographic locations. The attractiveness of battery storage was also examined. DOE

N83-12549# Washington State Energy Office, Olympia.
PASSIVE SOLAR ENERGY IN WASHINGTON: RESULTS OF THE WASHINGTON PASSIVE SOLAR DESIGN/BUILD/COMPETITION

Mar. 1982 56 p

(Contract DE-FG06-79RO-00003)

(DE82-020394; WAOENG-82-11) Avail: NTIS HC A04/MF A01

The Washington Passive Solar Design and Build Competition was held in an effort to encourage the design, construction, and marketing of moderately priced passive solar homes in Washington state. Four categories were established, including single and multi-family, new design and remodel. A number of commonly made thermal mistakes are discussed. Eight winning entries are presented along with four notable entries, for each of which is given an overview of the design, energy conservation measures, passive heating and cooling features, system operation, and thermal performance. DOE

N83-12550# Purdue Univ., Lafayette, Ind. School of Electrical Engineering.

HIGH-INTENSITY SOLAR CELLS Annual Report

R. J. SCHWARTZ, M. S. LUNDSTROM, and J. L. GRAY Jul. 1982 93 p refs

(Contract DE-AC04-76DP-00789)

(DE82-020420; SAND-82-7122) Avail: NTIS HC A05/MF A01

Described is a program to support an effort to develop high-efficiency, high-concentration solar cells. During the past year this support took the following forms: providing general analytic support for the development of high-efficiency solar cells, and developing a two-dimensional computer code suitable for modelling the performance of the solar cell and other high concentration cells currently under development. DOE

N83-12552# Stanford Univ., Calif. Center for Materials Research.

ELECTROLYTIC DEPOSITION OF LOW-COST, HIGH-PURITY POLYSILICON SUITABLE FOR USE IN SOLAR-CELL DEVICES Final Technical Report

R. S. FEIGELSON, R. A. HUGGINS, and D. ELWELL Mar. 1982 39 p refs

(Contract DE-AM03-76ER-70067)

(DE82-012428; DOE/ER-70067-T1; CMR-81-16) Avail: NTIS HC A03/MF A01

Two processes were developed for the commercial production of low cost solar silicon. In the first, silicon is deposited at about 7450 C onto a graphite substrate from a solution of K₂SiF₆ in the binary KF/LiF or ternary LiF/NaF/KF eutectic. The second process involves the deposition of silicon at temperatures above its melting point. Electrodeposition of silicon in the form of coherent, inclusion-free film was achieved, and a 99.999% purity level was attained. An average grain size over 100 microns was attained in films 100 to 200 microns thick, with good film uniformity and good carrier mobility. Electrodeposition of silicon above its melting point was attained at very rapid deposition rates. The purity of this

material was close to that required for a source material for pulling or casting of crystals for solar cells. DOE

N83-12553# Lincoln Lab., Mass. Inst. of Tech., Lexington.

DATA REPORT FOR THE NORTHEAST RESIDENTIAL EXPERIMENT STATION, MAY 1982

M. C. RUSSELL, P. RAGHURAMAN, and P. C. MAHONEY Jun. 1982 20 p refs

(Contract DE-AC02-76ET-20279)

(DE82-020398; DOE/ET-20279-220) Avail: NTIS HC A02/MF A01

Tabulated are physical performance data for the month of May 1982 obtained from photovoltaic energy systems. Five prototype residential photovoltaic systems are presently under test, each consisting of a roof-mounted photovoltaic array sized to meet at least 50% of the annual electrical demand of an energy-conserving house. In addition to these prototype residential photovoltaic systems are presently under test, each consisting of a roof-mounted photovoltaic array sized to meet at least 50% of the annual electrical demand of an energy-conserving house. In addition to these prototype systems and monitored houses, one full-sized photovoltaic residence is being monitored in Carlisle, Massachusetts. The features of the prototype systems and monitored houses are tabulated, and the monthly summary tabulates meteorological information, monitored house information, and data for the photovoltaic array and power conditioning unit and the utility interface. For each hour of an average day of the month and for each house, there is tabulated the total electric energy used, array output, inverter output, inverter power, load imposed on the prototype, energy supplied to and by the utility, solar array panel temperature, and total tilt insolation. DOE

N83-12554# Total Environmental Action, Inc., Harnsville, N.H.
DESIGN AND FABRICATION OF A PROTOTYPE SYSTEM FOR PHOTOVOLTAIC RESIDENCES IN THE SOUTHWEST Final Report

Jun. 1982 62 p Sponsored in part by New Mexico Solar Energy Inst and Lincoln Lab., Lexington

(Contract DE-AC02-76ET-20279)

(DE82-020783; DOE/ET-20279/209) Avail: NTIS HC A04/MF A01

Described are the design of a photovoltaic powered residence for the American Southwest, dubbed Casa fotovoltaica, and the construction of a prototype building at the Southwest Residential Experiment Station for testing the performance of the full size photovoltaic (PV) system. Included are architectural drawings of both the residence and the prototype, analysis of the energy requirements of the residence, prediction of PV system output, description of the electrical system, and history of the construction process of the prototype. DOE

N83-12555# Lincoln Lab., Mass. Inst. of Tech., Lexington.

SIMULATION OF THERMAL ASPECTS OF RESIDENTIAL PHOTOVOLTAIC SYSTEMS

G. W. HART and P. RAGHURAMAN Jun. 1982 37 p refs

(Contract DE-AC02-76ET-20279)

(DE82-020399; DOE/ET-20279/202) Avail: NTIS HC A03/MF A01

A program was developed to simulate the performance of utility interactive residential photovoltaic (PV) energy systems. The PV system is divided into its major functional components, which are individually described with computer models. These models are described in detail. The results of simulation and actual measured data are compared. The thermal influences on the design of such PV energy systems are given particular attention. DOE

02 SOLAR ENERGY

N83-12556# Lincoln Lab., Mass. Inst. of Tech., Lexington.
DATA REPORT FOR THE SOUTHWEST RESIDENTIAL EXPERIMENT STATION, MAR. 1982

M. LIEBERMAN, F. DURAND, G. HOCKING, and C. WHITAKER
26 May 1982 25 p refs Prepared in cooperation with New Mexico Energy Inst., Las Cruces
(Contract DE-AC02-76ET-20279)
(DE82-020400; DOE/ET-20279/197) Avail. NTIS HC A02/MF A01

Physical performance data obtained from the photovoltaic energy systems under test at the Southwest Residential Experiment Station in New Mexico are tabulated for the month of March 1982. Eight prototype residential photovoltaic systems are under test, each consisting of roof-mounted photovoltaic array sized to meet at least 50% of the annual electric demand of an energy-conserving house. An enclosed structure houses the remainder of the photovoltaic system equipment, test instrumentation, and work space. Each system is grid-connected. Features of the residential photovoltaic systems and monitored houses are tabulated. A monthly summary is provided of meteorological data, monitored house information, and photovoltaic array, power conditioning unit, and utility interface data. Monthly averages for each hour of an average day are given of total electric energy used by each house, and of array output, inverter output, load, energy supplied to and by utility, maximum power, and total tilt insolation for each prototype system. Energy histograms are provided for each prototype system. DOE

N83-12557# Department of Energy, Portland, Oreg. Power Administration.

SOLAR HOME SHOW: HOMES DESIGNED FOR THE SOLAR HOMEBUILDERS PROGRAM

Jul. 1982 23 p refs
(DE82-020255; DOE/BP-125) Avail. NTIS HC A02/MF A01

Ten passive solar homes are presented that resulted from a program to demonstrate that passive solar homes can be attractive, affordable, functional, and therefore, marketable. For each home is given: the designer and builder, floor plans, perspective of the outside, passive solar and conservation features, and a comparison of the estimated heating bill for the house and a conventional house the same size. A brief discussion is included on the basics of passive solar design, ventilation and cooling, and solar access. DOE

N83-12558# Brookhaven National Lab., Upton, N. Y.
HARNESSING THE SUN FOR DEVELOPMENT: ACTIONS FOR CONSIDERATION BY THE INTERNATIONAL COMMUNITY AT THE UN CONFERENCE ON NEW AND RENEWABLE SOURCES OF ENERGY FOR PROMOTING THE USE OF RENEWABLE ENERGY IN DEVELOPING COUNTRIES

D. J. JHIRAD, V. MUBAYI, and J. WEINGART (California Univ., Lawrence Berkeley Lab.) Inc. Aug. 1981 195 p refs Sponsored in part by the Agency for International Development Prepared in cooperation with Teknekron, Inc., Berkeley)
(Contract DE-AC02-76CH-00016)
(DE82-020273; BNL-51463) Avail. NTIS HC A09/MF A01

The technical and economic evidence is reviewed for solar industrial process heat, highlighting the fact that financial parameters such as tax credits and depreciation allowance play a very large role in determining the economic competitiveness of solar investments. An analysis of the energy (and oil) consumed in providing industrial process heat in a number of selected developing countries is presented. Solar industrial process heat technology is discussed including the operating experience of several demonstration plants in the US. Solar ponds are also described briefly. A financial and economic analysis of solar industrial process heat systems under different assumptions on future oil prices and various financial parameters is given. Financial analyses are summarized for a solar industrial process heat retrofit of a brewery in Zimbabwe and a high efficiency system operating in financial conditions typical of the US and a number of other industrialized nations. A set of recommended policy actions for countries wishing to enhance the commercial feasibility of

renewable energy technologies in the commercial and industrial sections is presented. DOE

N83-12560# Monsanto Research Corp., Dayton, Ohio.
SUPERIOR HEAT-TRANSFER FLUIDS FOR SOLAR HEATING AND COOLING APPLICATIONS. RESULTS OF ACUTE ORAL-TOXICITY DETERMINATIONS Final Report, 15 Sep. 1980 - 30 Apr. 1981

L. PARTS and D. L. CONINE (Hill Top Research, Cincinnati) Nov. 1981 36 p refs
(Contract DE-AC04-78CS-35356)
(DE82-002758; MRC-DA-1096-VOL-1) Avail. NTIS HC A03/MF A01

Acute oral toxicity tests were conducted with 22 different heat transfer fluids used in solar collectors. Included among these were three fluids that had been used in collector installations for periods of 1 to 3 years. The acute toxicological properties for transfer fluids when ingested by rats are examined. Their Gosselin's acute oral toxicity ratings range from 1 to 3. It is suggested that the acute oral toxicity of fluids used in solar collectors is sufficiently low that accidental ingestion of doses to produce a lethal effect is not very probable in normal use. By Gosselin's rating system, undiluted ethylene glycol based fluids are classified by toxicity rating of 2 whereas propylene glycol based fluids have the rating 1. It is found that the use of ethylene glycol and propylene glycol based fluids for 1 year, and of an aliphatic hydrocarbon type fluid for 3 years, do not increase their acute toxicological properties significantly. DOE

N83-12562# North Carolina Agricultural and Technical State Univ., Greensboro. Dept. of Electrical Engineering.

SOLAR-CELL TESTING AND EVALUATION

E. K. STEFANAKOS and W. J. COLLIS Apr. 1982 43 p refs
(Contract DE-AC04-76DP-00789)
(DE82-016179; SAND-81-7194) Avail. NTIS HC A03/MF A01

A two year study of the degradation effects in AlGaAs/GaAs solar cells is described. Illuminated current-voltage measurements were made during temperature and humidity cycling and time dependent degradation measurements were recorded. DOE

N83-12563# Borg-Warner Corp., Los Angeles, Calif.
SOLAR-ENERGY-SYSTEM PERFORMANCE EVALUATION, CATHEDRAL SQUARE, BURLINGTON, VERMONT, JULY - DECEMBER 1981

K. M. WELCH 1981 83 p refs
(Contract DE-AC01-79CS-30027)
(DE82-016999; SOLAR/1060-82/14) Avail. NTIS HC A05/MF A01

A 10 story multiunit apartment building has an active solar energy system which is designed to supply 51% of the hot water load, and consists of 1798 square feet of flat plate collectors, a 2699 gallon water tank in an enclosed mechanical room on the roof, and two auxiliary natural gas boilers to supply hot water to an immersed heat exchanger in an auxiliary storage tank. The measured solar fraction was only 28%, not 51%, which, it is concluded, is an unreasonable expectation. Other performance data include the solar savings ratio, conventional fuel savings, system performance factor, and solar system coefficient of performance. Monthly performance data are given for the solar system overall, and for the collector, storage, and hot water subsystems. Insolation data, typical storage fluid temperatures, domestic hot water consumption, and solar heat exchangers inlet-output temperatures, and typical domestic hot water subsystem temperatures are also included. In addition, the system operating sequence, solar energy utilization. A system description, performance evaluation techniques, and long term weather data are given. DOE

02 SOLAR ENERGY

N83-12566# TEA, Inc., Harrisville, N.H.
STUDY OF PHOTOVOLTAIC RESIDENTIAL RETROFITS.
VOLUME 2: MAIN REPORT

D. E. MAHONEY, P. L. TEMPLE, J. A. ADAMS, B. B. CHALMERS, A. D. MOTTER, and A. E. MILLNER Apr. 1982 267 p refs
 Prepared in cooperation with TrnSolar Corp.
 (DE82-015626; SAND-81-7019-VOL-2) Avail: NTIS HC A12/MF A01

The problems and potentials for widespread residential retrofits of PV power systems are analyzed. Included are data on the existing housing stock, designs for array mounting and system electrical wiring, and economic analyses for retrofits. DOE

N83-12567# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

ROSET: A SOLAR-THERMAL ELECTRIC-POWER SIMULATION USERS GUIDE

R. ODOHERTY Aug. 1982 78 p refs
 (Contract DE-AC02-77CH-00178; EG-77-C-01-4042)
 (DE82-021997; SERI/TR-214-1449) Avail: NTIS HC A05/MF A01

The use of a set of computer programs (ROSET) that simulate solar thermal electric power systems is outlined. The ROSET is designed to function as part of a larger package of computer models. These models can be used with most utility planning models as part of a method for determining the value of solar energy power systems to electric utilities. DOE

N83-12568# Lincoln Lab., Mass. Inst. of Tech., Lexington.
ELECTRICAL ASPECTS OF PHOTOVOLTAIC-SYSTEM SIMULATION

G. W. HART and P. RAGHURAMAN Jun. 1982 22 p refs
 (Contract DE-AC02-76ET-20279)
 (DE82-021956; DOE/ET-20279/207) Avail: NTIS HC A02/MF A01

A TRNSYS simulation was developed to simulate the performance of utility interactive residential photovoltaic energy systems. The PV system is divided into major functional components, which are individually described with computer models. The results of simulation and actual measured data are compared. The electrical influences on the design of such photovoltaic energy systems are given particular attention. GRA

N83-12569# Lincoln Lab., Mass. Inst. of Tech., Lexington
DATA REPORT FOR THE NORTHEAST RESIDENTIAL EXPERIMENT STATION, APR. 1982

M. C. RUSSELL, P. RAGHURAMAN, and P. C. MAHONEY Jun. 1982 20 p refs
 (Contract DE-AC02-76ET-20279)
 (DE82-021954; DOE/ET-20279/214) Avail: NTIS HC A02/MF A01

Physical performance data obtained from photovoltaic energy systems under test at the Northeast Residential Experiment Station (NE RES) in Concord, Massachusetts, are tabulated for the month of April 1982. Five prototype residential photovoltaic systems are under test at the NE RES, each consisting of a roof mounted array sized to meet at least 50% of the annual electrical demand of an energy conserving house, and an enclosed structure to house the remainder of the photovoltaic system equipment, test instrumentation, and work space. Each system is grid connected. In addition, one full sized PV residence, the Carlisle House, is also being monitored in Carlisle, Massachusetts. The features of the systems and of the houses, are briefly summarized, and the monthly performance of the monitored houses, PV systems, and meteorological data is tabulated. Also tabulated is hourly information for an average day of the month including data on the monitored houses and prototype systems data. Data include energy consumption, array and inverter outputs, energy supplied to and by the utility, solar array panel temperatures, and total tilt insolation. Also included are tables that present the hypothetical energy exchange between the system and the utility if each prototype system supplied energy to each monitored house. These

data are also graphed, as well as the duration of time for which the load had a specific value. DOE

N83-12570# Lincoln Lab., Mass. Inst. of Tech., Lexington. Field Tests and Applications Center

PV MODULE DEGRADATION-ANALYSIS Final Report

M. P. THEMELIS Jun. 1982 60 p refs
 (Contract DE-AC02-76ET-20279)
 (DE82-021123; DOE/ET-20279/189) Avail: NTIS HC A04/MF A01

The energy potential of photovoltaic (PV) components in various test applications were evaluated. Visual and electrical degradation analyses were performed on 47 PV modules. Discoloration, cracking, scratches, and electrical degradation were detected. DOE

N83-12574# Automation Industries, Inc., Silver Spring, Md. Vitro Labs. Div.

WILLIAMSON HOME, IPSWICH, MASS. SOLAR-ENERGY-SYSTEM PERFORMANCE EVALUATION, NOV. 1981 - APR. 1982

M. CRAMER 1982 82 p refs
 (Contract DE-AC01-79CS-30027)
 (DE82-021300; SOLAR/1115-82/14) Avail: NTIS HC A05/MF A01

Data on solar water and space heating systems are given. The Williamson Home in Massachusetts is a single family residence whose active-solar-energy system is designed to supply 47% of the space heating and 91% of the hot water. The system is equipped with 339 square feet of flat plate collectors, a 240-cubic-foot rock bin for storage, a propane-gas furnace and a 100-gallon propane gas hot water tank for auxiliary heating. Monthly performance data are tabulated for the overall system and for the collector, hot water, and space heating subsystems. Also tabulated are solar coefficients of performance, solar operating energy, energy savings, and weather conditions. Also given is a graph of collector array efficiency versus the difference between the inlet water and ambient temperatures divided by insolation. System operation is illustrated by graphs of typical insolation data and outside ambient and indoor temperatures, collector operating periods and inlet/outlet temperatures, and typical storage and distribution temperatures versus time for a typical day. The system operating sequence and solar energy utilization and losses are also graphed. GRA

N83-12575# Automation Industries, Inc., Silver Spring, Md. Vitro Labs. Div.

LO-CAL, CHAMPAIGN, ILLINOIS SOLAR-ENERGY-SYSTEM PERFORMANCE EVALUATION, JAN. 1982 - APR. 1982

J. W. SPEARS 1982 73 p refs
 (Contract DE-AC01-79CS-30027)
 (DE82-021299; SOLAR/1109-82/14) Avail: NTIS HC A04/MF A01

Performance data on a solar heated house are given. The Lo-Cal site is a single family residence in Illinois with a direct gain solar heating system equipped with 200 square feet of south facing triple glazed windows and an auxiliary 84,000 Btu hour forced air furnace. For the months of January through April 1982, the solar fraction was found to be 29%, corresponding to a saving of 3107 kWh of conventional fuel. Monthly performance data are tabulated for the overall system, and for the collector and space heating subsystems. Also tabulated are monthly energy savings, weather, and passive system environment data. The building's performance is illustrated by graphs for each month of the daily insolation, auxiliary heat, building temperature, and ambient temperature. DOE

02 SOLAR ENERGY

N83-12576# Automation Industries, Inc., Silver Spring, Md. Vitro Labs. Div.
ISAKSON HOME, ANOKA, MINNESOTA
SOLAR-ENERGY-SYSTEM PERFORMANCE EVALUATION, AUG. 1981 - MAR. 1982

M. CRAMER 1982 77 p refs
(Contract DE-AC01-79CS-30027)
(DE82-021297; SOLAR/1116-82/14) Avail: NTIS HC A05/MF A01

Performance data on a residential solar water and space heating system are given. The Isakson Home in Minnesota is a single family residence whose active solar energy system is designed to supply 76% of the heating and hot water load. The system consists of 183 square feet of flat plate collectors, a 350 gallon water storage tank, and for back up, an oil fired furnace and 52 gallon electric water heater. Monthly performance data are given for the overall system and for the collector, domestic hot water, and space heating subsystem. Monthly data are also tabulated for the coefficient of performance, solar operating energy, energy savings, and weather. Typical system operation is illustrated by graphs of temperatures at various parts of the system versus time for a typical day, and by graphs of fuel use and hot water use versus time. The system operating sequence is also graphed and solar energy utilization and losses are given. DOE

N83-12577# Automation Industries, Inc., Silver Spring, Md. Vitro Labs. Div.
KARASEK HOME, BLACKSTONE, MASSACHUSETTS
SOLAR-ENERGY-SYSTEM PERFORMANCE EVALUATION, NOV. 1981 - MAR. 1982

M. RAYMOND 1982 89 p refs
(Contract DE-AC01-79CS-30027)
(DE82-021302; SOLAR/1120-82/14) Avail: NTIS HC A05/MF A01

The Karasek Home is a single family Massachusetts residence whose active-solar-energy system is equipped with 640 square feet of trickle-down liquid flat-plate collectors, storage in a 300-gallon tank and a 2000-gallon tank embedded in a rock bin in the basement, and an oil-fired glass-lined 40-gallon domestic hot water tank for auxiliary water and space heating. Monthly performance data are tabulated for the overall system and for the collector, storage, space heating, and domestic hot water subsystems. For each month a graph is presented of collector array efficiency versus the difference between the inlet water temperature and ambient temperature divided by insolation. Typical system operation is illustrated by graphs of insolation and temperatures at different parts of the system versus time for a typical day. The typical system operating sequence for a day is also graphed as well as solar energy utilization and heat losses. DOE

N83-12585# Automation Industries, Inc., Silver Spring, Md. Vitro Labs. Div.
TELLURIDE SCHOOL, TELLURIDE, COLORADO
SOLAR-ENERGY-SYSTEM PERFORMANCE EVALUATION, FEBRUARY 1982 - APRIL 1982

K. M. WELCH 1982 80 p refs
(Contract DE-AC01-79CS-30027)
Avail: NTIS HC A05/MF A01

In Colorado with a passive/active hybrid solar energy system designed to supply 40% of the heating load is discussed. The school is equipped with a 1428 square foot, double glazed Trombe wall, a 1392 square foot greenhouse with collection tube, and an auxiliary oil fired boiler. Monthly performance data are tabulated for the overall system and for the Trombe wall, greenhouse, and greenhouse storage. System operation is illustrated by graphs of typical Trombe wall insolation and temperatures and typical greenhouse insolation and temperatures. DOE

N83-12586# Automation Industries, Inc., Silver Spring, Md. Vitro Labs. Div.
WOOD ROAD SCHOOL, BALLSTON SPA, NEW YORK
SOLAR-ENERGY-SYSTEM PERFORMANCE EVALUATION, NOVEMBER 1981 - APRIL 1982

P. W. KENDALL 1982 86 p refs
(DE82-021301; SOLAR/2125-82/14) Avail: NTIS HC A05/MF A01

The Wood Road School Solar Project is a 216,000 square foot (136,510 square feet of sola conditioned space) school located in New York. The solar energy system supplies 64% of the space heating and 88% of the hot water. The system is equipped with 15,389 square feet of one type of flat plate collector panels and 6650 square feet of another type. Storage is in two 15,000 gallon storage tanks, and auxiliary heating is by electric resistance strip heaters. Monthly performance data are tabulated for the overall system and for each type of collector, storage, domestic hot water, and space heating subsystems. Weather conditions energy savings, operating energy, and coefficients of performance are tabulated monthly. Graphs are provided of collector array efficiency vs the difference between the fluid inlet temperature and ambient temperature divided by insolation. System operation is illustrated by graphs of collector array inlet/outlet temperatures and ambient temperature and typical building loop temperatures vs time for a typical day. The system operating sequence and the solar energy utilization and energy losses are graphed. DOE

N83-12587# Midwest Research Inst., Golden, Colo. Component Development and Fabrication Group.

STRUCTURAL DESIGN CONSIDERATIONS FOR A LINE-FOCUS REFLECTIVE MODULE USING INEXPENSIVE COMPOSITE MATERIALS

L. M. MURPHY Aug. 1982 59 p refs
(Contract DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE82-021611; SERI/TR-253-1450) Avail: NTIS HC A04/MF A01

The structural design aspects of a parabolic trough reflective module is addressed. The reflective module is a lightweight, low flexural rigidity design that is rotated about the focal line. The modules and support frame are designed to rotate with a cable drive system in a cross row manner. Analysis indicates that the structural and optical aspects of the reflector frame concept are adequate, with dramatic savings in weight and costs for the structure. DOE

N83-12588# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

SCATTERPLATE FLUX MAPPING FOR SOLAR CONCENTRATORS

K. MASTERSON and M. BOHN Sep. 1982 17 p refs Presented at the Ann. Meeting of the Optical Soc. of Am., Chicago, 13-17 Oct. 1981

(Contract DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE82-021359; SERI/TR-255-1432) Avail: NTIS HC A02/MF A01

Developing the ability to characterize accurately the spatial distribution of solar energy at the receiver is a part of advanced solar thermal conversion technology. High power levels near the focus of a point focus concentrator make this difficult because of the large thermal stress placed on materials and components. A scatterplate flux mapping technique developed at the Solar Energy Research Institute (SERI) that solves many material problems and the optical characteristics of several scatterplate materials are described. The errors contributed by a scatterplate with nonideal characteristics typical of the materials used are assessed. DOE

N83-12589# National Bureau of Standards, Washington, D.C.
**COMPARATIVE ANALYSIS OF ECONOMIC MODELS IN
 SELECTED SOLAR ENERGY COMPUTER PROGRAMS Final
 Report**

J. W. POWELL and K. A. BARNES Jan. 1982 83 p refs
 Sponsored by DOE
 (PB82-184995; NBSIR-81-2379) Avail: NTIS HC A05/MF A01
 CSCL 10A

The economic evaluation models in five computer programs widely used for analyzing solar energy systems (F-CHART 3.0, F-CHART 4.0, SOLCOST, BLAST, and DOE-2) are compared. Differences in analysis techniques and assumptions among the programs are assessed from the point of view of consistency with the Federal requirements for life cycle costing (10 CFR Part 436), effect on predicted economic performance, and optimal system size, case of use, and general applicability to diverse systems types and building types. The FEDSOL program developed by the National Bureau of Standards specifically to meet the Federal life cycle cost requirements serves as a basis for the comparison. Results of the study are illustrated in test cases of two different types of Federally owned buildings: a single family residence and a low rise office building. A.R.H.

N83-13504# Sandia Labs., Albuquerque, N. Mex.
**CONTACT STRESSES ON A THIN PLATE AFTER LARGE
 DISPLACEMENTS TO A FULL PARABOLIC SURFACE**
 R. C. REUTER, JR. and R. K. WILSON Dec. 1981 26 p refs
 (Contract DE-AC04-76DP-00789)
 (DE82-005712; SAND-81-2083) Avail: NTIS HC A03/MF A01

A solution is obtained for the determination of all loads necessary to hold an initially flat, thin, elastic plate in the shape of a prescribed parabolic surface, following large displacement. These loads include spatially varying normal tractions distributed over the back surface of the plate, and a uniform shear force and bending moment applied along the opposing edges which become the rims of the parabola after deformation. The plate represents a reflective surface which is mechanically deformed to the shape of, and bonded to a rigid, parabolic substructure to create a solar collector. After assembly, the normal stresses are those developed in the adhesive which bonds the reflective surface to the substructure. The absence of edge loads along the rims of an actual, formed reflective surface gives rise to local displacement and stress variations (edge effects) which are obtained through a separate solution. Numerical results for the normal stress distribution, local variations and loss of optical quality in the edge effect zone are included. DOE

N83-13579* National Aeronautics and Space Administration
 Lewis Research Center, Cleveland, Ohio.
**SOLAR CELL HAVING IMPROVED BACK SURFACE
 REFLECTOR Patent**

A. T. CHAI, inventor (to NASA) 19 Oct. 1982 5 p Filed 11 Mar. 1981
 (NASA-CASE-LEW-13620-1; US-PATENT-4,335,196;
 US-PATENT-APPL-SN-242796; US-PATENT-CLASS-136-259;
 US-PATENT-CLASS-29-572; US-PATENT-CLASS-136-256;
 US-PATENT-CLASS-357-30; US-PATENT-CLASS-427-88;
 US-PATENT-CLASS-427-89; US-PATENT-CLASS-427-90;
 US-PATENT-CLASS-427-91) Avail: US Patent and Trademark
 Office CSCL 10A

The operating temperature is reduced and the output of a solar cell is increased by using a solar cell which carries electrodes in a grid finger pattern on its back surface. These electrodes are sintered at the proper temperature to provide good ohmic contact. After sintering, a reflective material is deposited on the back surface by vacuum evaporation. Thus, the application of the back surface reflector is separate from the back contact formation. Back surface reflectors formed in conjunction with separate grid finger configuration back contacts are more effective than those formed by full back metallization of the reflector material.

Official Gazette of the U.S. Patent and Trademark Office

N83-13580 Utah State Univ., Logan.
**A COMPUTER SIMULATION MODEL OF SALT-GRADIENT
 SOLAR PONDS Ph.D. Thesis**
 Z. PANAH 1982 196 p

Avail: Univ. Microfilms Order No. DA8224162

The mass and energy transfer processes of a salt gradient solar pond were developed into a finite element of computer model. The system represented by the model can be: (1) a nonconvective salt gradient solar pond for which the energy transfer takes place by conduction through the brine and the ground beneath the pond; (2) a stratified three zone solar pond consisting of upper and lower convective zones and a nonconvective gradient zone in between. The temperature of the upper and lower convective zones are predicted in terms of the net energy input to the zones. The energy fluxes at the pond surface include: reflected and absorbed solar radiation, evaporation energy loss, net long wave radiation loss to the atmosphere, advected energy of precipitation and inflow water, and convective heat loss at the surface. Dissert. Abstr.

N83-13581* Jet Propulsion Lab., California Inst. of Tech., Pasadena.

**SOLAR THERMAL TECHNOLOGY REPORT, FY 1981. VOLUME
 1: EXECUTIVE SUMMARY Annual Technical Progress Report**
 Jun. 1982 11 p refs Sponsored in part by NASA 2 Vol.
 (Contract DE-AI01-79ET-20307; DE-AM04-80AL-13137)
 (NASA-CR-169526; JPL-PUB-82-60-VOL-2;
 DOE/JPL-1060-53-VOL-2; NAS 1.26:169526) Avail: NTIS HC
 A02/MF A01 CSCL 10A

The activities of the Department of Energy's Solar Thermal Technology Program are discussed. Highlights of technical activities and brief descriptions of each technology are given. Solar thermal conversion concepts are discussed in detail, particularly concentrating collectors and salt-gradient solar ponds. R.J.F.

N83-13582* Jet Propulsion Lab., California Inst. of Tech., Pasadena.

**SOLAR THERMAL TECHNOLOGY REPORT, FY 1981. VOLUME
 2: TECHNICAL Annual Technical Progress Report**
 Jun. 1982 113 p refs Sponsored in part by NASA 2 Vol.
 (Contract DE-AI01-79ET-20307; DE-AM04-80AL-13137)
 (NASA-CR-169527; JPL-PUB-82-60-VOL-1;
 DOE/JPL-1060-53-VOL-1; NAS 1.26:169527) Avail: NTIS HC
 A06/MF A01 CSCL 10A

Detailed descriptions of the Department of Energy's Solar Thermal Technology Program projects and activities are given. A bibliography on solar energy conversion is included. R.J.F.

N83-13583* Jet Propulsion Lab., California Inst. of Tech., Pasadena.

**PRICE ESTIMATES FOR THE PRODUCTION OF WAFERS FROM
 SILICON INGOTS**

A. R. MOKASHI 15 Sep. 1982 30 p refs
 (Contract DE-AI01-76ET-20356)
 (NASA-CR-169517; DOE/JPL-1012-74; JPL-5101-212;
 JPL-PUB-82-65; NAS 1.26:169517) Avail: NTIS HC A03/MF
 A01 CSCL 10A

The status of the inside-diameter sawing, (ID), multi-blade sawing (MBS), and fixed-abrasive slicing technique (FAST) processes are discussed with respect to the estimated price each process adds on to the price of the final photovoltaic module. The expected improvements in each process, based on the knowledge of the current level of technology, are projected for the next two to five years and the expected add-on prices in 1983 and 1986 are estimated. M.G.

02 SOLAR ENERGY

N83-13585*# **rse Soviet energy production will take if present policies in the West and the USSR remain unchanged is investigated.**Opportu

MARKET ASSESSMENT OF PHOTOVOLTAIC POWER SYSTEMS FOR AGRICULTURAL APPLICATIONS WORLDWIDE Final Report

A CABRAAL, D. DELASANTA, J. ROSEN, J. NOLFI (ARD, Inc.), and R. ULMER (ARD, Inc.) Nov. 1981 89 p refs

(Contract DEN3-180; DE-AI01-79ET-20485)

(NASA-CR-165541; DOE/NASA/0180-6; NAS 1.26:165541)

Avail: NTIS HC A05/MF A01 CSCL 10B

Agricultural sector PV market assessments conducted in the Philippines, Nigeria, Mexico, Morocco, and Colombia are extrapolated worldwide. The types of applications evaluated are those requiring less than 15 kW of power and operate in a stand alone mode. The major conclusions were as follows: PV will be competitive in applications requiring 2 to 3 kW of power prior to 1983; by 1986 PV system competitiveness will extend to applications requiring 4 to 6 kW of power, due to capital constraints, the private sector market may be restricted to applications requiring less than about 2 kW of power; the ultimate purchase of larger systems will be governments, either through direct purchase or loans from development banks. Though fragmented, a significant agriculture sector market for PV exists; however, the market for PV in telecommunications, signalling, rural services, and TV will be larger. Major market related factors influencing the potential for U.S. PV Sales are: lack of awareness; high first costs; shortage of long term capital, competition from German, French and Japanese companies who have government support; and low fuel prices in capital surplus countries. Strategies that may aid in overcoming some of these problems are: setting up of a trade association aimed at overcoming problems due to lack of awareness, innovative financing schemes such as lease arrangements, and designing products to match current user needs as opposed to attempting to change consumer behavior. Author

N83-13586*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

SUMMARY OF FLAT-PLATE SOLAR ARRAY PROJECT DOCUMENTATION. ABSTRACTS OF PUBLISHED DOCUMENTS, 1975 TO JUNE 1982

15 Sep. 1982 372 p Sponsored in part by DOE

(NASA-CR-169518; JPL-PUBL-82-79; DOE/JPL-1012-76;

JPL-5101-221, NAS 1.26:169518) Avail: NTIS HC A16/MF A01 CSCL 10A

Technologies that will enable the private sector to manufacture and widely use photovoltaic systems for the generation of electricity in residential, commercial, industrial, and government applications at a cost per watt that is competitive with other means is investigated. Silicon refinement processes, advanced silicon sheet growth techniques, solar cell development, encapsulation, automated fabrication process technology, advanced module/array design, and module/array test and evaluation techniques are developed. S.L.

N83-13596# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

PERFORMANCE CRITERIA FOR PHOTOVOLTAIC ENERGY SYSTEMS, VOLUME 1

G. NUSS, R. DEBLASIO, S. FORMAN, A. HOFFMAN, S. HOGAN, P. LONGRIGG, H. POST, R. ROSS, and H. SCHAFFT Jul. 1982 179 p 2 Vol.

(Contract DE-AC02-77CH-00178)

(DE82-021958, SERI/TR-214-1567-VOL-1) Avail: NTIS HC A09/MF A01

The state of the art in defining performance criteria for photovoltaic (PV) systems and their components the PV array, power conditioning, monitor and control, and storage subsystems, cabling, and power distribution is presented. Each performance criterion consists of a criterion statement, an evaluation statement and a commentary statement. Performance criteria deal with: electrical, thermal, mechanical/structural, safety, durability/reliability, installation, operation and maintenance, and

building and site characteristics. The performance criteria are not prescriptive; they are performance oriented to allow for innovation and for a variety of approaches to obtain desired objectives for a PV system or subsystem. A glossary is presented with definitions relevant to photovoltaic subsystems. DOE

N83-13597# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

PERFORMANCE CRITERIA FOR PHOTOVOLTAIC ENERGY SYSTEMS, VOLUME 2

G. NUSS, R. DEBLASIO, S. FORMAN, A. HOFFMAN, S. HOGAN, P. LONGRIGG, H. POST, R. ROSS, and H. SCHAFFT Jul 1982 242 p refs 2 Vol.

(Contract DE-AC02-77CH-00178)

(DE82-021683; SERI/TR-214-1567-VOL-2) Avail: NTIS HC A11/MF A01

A unified body of test procedures for the evaluation of photovoltaic subsystem performance criteria was established. The test methods represent recommended evaluation procedures, but they are not consensus standards tests. The tests address electrical, thermal, mechanical, and durability aspects of the solar cell array, and the electrical aspects of the power conditioning subsystem and battery storage subsystem. DOE

N83-13599# Sandia Labs., Albuquerque, N. Mex.

INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENTAL OPERATIONAL PERFORMANCE REPORT FOR CDC LIGHT MANUFACTURING BUILDING, SAN BERNARDINO, CALIFORNIA

Aug 1982 25 p Prepared in cooperation with Boeing Computer Services Co.

(Contract DE-AC04-76DP-00789)

(DE82-020883; SAND-81-7089/3) Avail: NTIS HC A02/MF A01

The data accumulated during May at the intermediate photovoltaic project at the CDC Light Manufacturing Bldg., San Bernardino, California are presented. Generated energy and environmental (weather) data are presented graphically. Explanations of irregularities which are not attributable to weather are provided. DOE

N83-13600# California Univ., Berkeley. Lawrence Berkeley Lab

ELECTROCHEMICAL STORAGE CELL BASED ON POLYCRYSTALLINE SILICON Final Report, 1 Mar. 1981 - 1 Mar. 1982

D. CANFIELD and S. R. MORRISON 28 Feb. 1982 56 p refs

(Contract DE-AC03-76SF-00098)

(DE82-020595, LBL-14639) Avail: NTIS HC A04/MF A01

Theoretical and experimental investigations on the performance of n and p type silicon in solution for efficient solar energy conversion were conducted. Part of the work sought to identify redox couples capable of inducing maximum band bending (highest open circuit voltage) and limit the corrosion for both n and p type silicon. High photovoltages were obtained by using vanadium (II/III) and ferrocene/ferricinium couples for p type and n type silicon respectively. These couples demonstrated reasonable stability, but their efficiency was limited by the growth of a relatively thick insulating SiO₂ corrosion layer. Corrosion studies were performed to evaluate the use of HF to remove the corrosion layer and to consider the interaction between HF and the redox couple. Much of the experimental and theoretical work focused on the effect of the surface oxide on solar cell characteristics and led to a variety of surface treatments aimed at improving the fill factor of silicon photoelectrochemical cells. The surface treatments included high temperature annealing of the normal oxide under an argon or hydrogen atmosphere, coating a p n junction with a thin layer of platinum, and passivation with poly-vinylcarbazole polymer. DOE

N83-13603# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

AN OVERVIEW OF SOLAR INDUSTRIAL PROCESS-HEAT (SIPH) APPLICATIONS BELOW 120 DEG C

F. KREITH and R. DAVENPORT Nov. 1981 37 p refs
(Contract DE-AC02-77CH-00178)
(DE82-021360; SERI/TR-252-1438) Avail. NTIS HC A03/MF A01

An overview of solar industrial process heat (SIPH) technologies and economics for applications below 1200 C is given and a procedure for optimally matching solar systems to industrial energy requirements is outlined. Cost and system performance of operational SIPH installations are summarized, and steps required to reduce the cost of the energy delivered by future SIPH systems are presented. DOE

N83-13604# Sandia Labs., Livermore, Calif.

SOLAR COGENERATION

Apr. 1982 20 p refs
(Contract DE-AC04-76D-00789)
(DE82-019085; DOE/NBM-2019085) Avail. NTIS HC A02/MF A01

After a brief introduction to the operational principles and advantages of solar cogeneration, seven cogeneration studies are summarized covering such applications as sulfur mining, copper smelting, enhanced oil recovery, natural gas processing, sugar mill operations, and space heating and cooling. For each plant is given a brief site description, project summary, conceptual design, and functional description, including a picture of the facility and a flow chart. Also listed are the addresses of the companies involved for obtaining additional information. DOE

N83-13615# Trinity Univ., San Antonio, Tex.
DEVELOPMENT OF THE TRICKLE ROOF COOLING AND HEATING SYSTEM: EXPERIMENTAL PLAN

P. HAVES, T. JANKOVIC, and E. DODERER Jul 1982 62 p refs
(Contract DE-AC03-79CS-30201)
(DE82-019082; DOE/CS-30201-T9) Avail. NTIS HC A04/MF A01

A passive system applicable both to retrofit and new construction was developed. This system (the trickle roof system) dissipates heat from a thin film of water flowing over the roof. A small scale trickle roof system dissipator was tested at Trinity University under a range of ambient conditions and operating configurations. The results suggest that trickle roof systems should have comparable performance to roof pond systems. Provided is a review of the trickle roof system concept, several possible configurations, and the benefits the systems can provide. Test module experiments and results are presented in detail. The requirements for full scale testing are discussed and a plan is outlined using the two identical residential scale passive test facility buildings at Trinity University, San Antonio, Texas. Full scale experimental results would be used to validate computer algorithms, provide system optimization, and produce a nationwide performance assessment and design guidelines. This would provide industry with the information necessary to determine the commercial potential of the trickle roof system. DOE

N83-13616# County of Orange, Santa Ana, Calif.
ACCEPTANCE-TEST REPORT FOR EL TORO LIBRARY SOLAR HEATING AND COOLING DEMONSTRATION PROJECT (SHAC NO. 1501)

30 Mar. 1982 92 p
(Contract DE-FC03-77CS-31501)
(DE82-019859; DOE/CS-31501-T1) Avail. NTIS HC A05/MF A01

The results from various mode acceptance tests on the El Toro Library Solar Energy System, are presented. All the modes tested function as designed. Collector array efficiencies are calculated at approximately 40%. Chiller COP is estimated at .50, with chiller loop flow rates approximately 85 to 90% of design flow. The acceptance test included visual inspection, preoperational testing

and procedure verification, operational mode checkout, and performance testing. DOE

N83-13622# Bechtel Corp., San Francisco, Calif.
PHOTOVOLTAIC BALANCE-OF-SYSTEM ASSESSMENT Final Report

Jun. 1982 136 p refs Sponsored by Electric Power Research Inst.
(Contract EPRI PROJ. 1975-2)
(DE82-906429; EPRI-AP-2474) Avail. NTIS HC A07/MF A01

The balance-of-system (BOS) status is assessed for photovoltaic power systems. The BOS includes all subsystems and components, except cells and modules, needed for a fully functional power system. The objectives of the study include status assessment and installed cost estimation for BOS subsystems and components, and estimates of system operation and maintenance requirements. The assessment was carried out for representative central station, intermediate, and residential applications. Array types evaluated include flat plate and Fresnel lens concentrator for the central station; ground- and roof-mounted flat plate, and Fresnel lens and north-south parabolic trough concentrators for intermediate applications; and integral and direct-mounted flat plate for residential applications. Active and passive cooling are considered for central station and intermediate applications. Battery energy storage is included as an option for intermediate and residential applications. Results of the study indicate that array structures and power conditioning subsystems are major BOS cost elements. DOE

N83-13623# Electric Power Research Inst., Palo Alto, Calif. Advanced Power Systems Div.

ELECTRIC-UTILITY SOLAR-ENERGY ACTIVITIES: 1981 SURVEY

E. BACCELLI and K. GORDON Jul. 1982 318 p
(DE82-905804; EPRI-AP-2516-SR) Avail. NTIS HC A14/MF A01

Presented are the results of a survey to determine the scope of electric participation in solar energy projects in the United States. Brief descriptions are given of 943 projects being conducted by 236 utility companies. An index of projects by category, a statistical summary, a list of participating utilities with information contacts and addresses, a list of utilities with projects organized by technology, a list of utilities organized by state, a list of available reports on utility-sponsored projects, and a list of projects having multiple utility participants are included. DOE

N83-13626# Toulouse Univ. (France).
THE REDUCTION OF RADIATION DAMAGE IN SOLAR CELLS. A STUDY OF RADIATION DEFECTS IN SILICON, FIRST PHASE Final Report

J. BERNARD (ONERA, Toulouse), D. BIELLE-DASPET (Centre d'Etude Spatiale des Rayonnements), J. BOURGOIN (Paris Univ. VII), and L. C. MUNOZ (Gorge Girona Salgado SN) Paris ESA Jun. 1981 100 p refs
(Contract ESTEC-4510/80/NL-JS(SC))

(CESR-81-985; ESA-CR(P)-1617) Avail. NTIS HC A05/MF A01
Research on space environmental flux and simulation of spatial conditions, defects induced by electron and proton radiation, and photon effects, in n and p-type silicon, microscopic and macroscopic measurement techniques for the study of defect properties and lifetime degradation in silicon solar cells, and numerical models for space solar cell and degradation prediction was surveyed. Long term prediction of solar generator degradation is limited by an insufficient knowledge of the degradation mechanisms of the solar cells in space. In space, p-type silicon behaves better than n-type. Lithium introduction in n-type silicon gives improvement only in particular structures. The role that lithium plays is difficult to identify and the time stability of lithium doped cells is uncertain. The major effects of photon degradation appear to be related to the presence of boron when the oxygen and carbon contents of the material are simultaneously low.

Author (ESA)

02 SOLAR ENERGY

N83-13632# National Bureau of Standards, Washington, D.C. Building Equipment Div.

A COMPARISON OF UNGLAZED FLAT PLATE LIQUID SOLAR COLLECTOR THERMAL PERFORMANCE USING THE ASHRAE STANDARD 96-1980 AND MODIFIED BSE TEST PROCEDURES

J. P. JENKINS and K. A. REED May 1982 36 p refs
Sponsored in part by DOE

(PB82-237660; NBSIR-82-2522) Avail: NTIS HC A03/MF A01 CSCL 10A

The report reviews the BSE procedure and summarizes the ASHRAE Standard 96-1980 for testing unglazed solar collectors. The ASHRAE procedure consists exclusively of outdoor testing, whereas the BSE procedure requires a combination of outdoor and indoor testing (no irradiation) to determine the collector optical and thermal loss characteristics, respectively. Two unglazed flat plate liquid solar collectors were tested according to ASHRAE Standard 96-1980 and BSE procedures and the results compared. During the indoor BSE thermal loss tests blowers were used to simulate winds of 0-3.9 m/s (0-8.72 mi/hr) to investigate the wind effect upon collector thermal losses. Author (GRA)

N83-13672# Weston (Roy F.), Inc., West Chester, Pa. **TECHNOLOGY ASSESSMENT OF SOLAR THERMAL ENERGY APPLICATIONS IN WASTEWATER TREATMENT Final Report, May 1980 - Aug. 1981**

Feb. 1982 112 p refs
(Contract EPA-68-03-2775)

(PB82-229790; EPA-600/2-82-006) Avail: NTIS HC A06/MF A01 CSCL 13B

Three major areas were identified for which solar thermal energy usage has potential applicability in publicly owned treatment works. These areas include space and domestic water heating, anaerobic digester heating, and sludge drying. A detailed analysis of solar heating of anaerobic digesters utilizing an active solar energy (flat-plate collector) system is given. A present worth cost-effectiveness analysis was performed whereby the present worth of the anaerobic digester gas conserved was compared to the present worth of the solar energy collection system. Based on the analysis, solar-aided anaerobic digester heating proved uneconomical at all locations within the United States. A sensitivity analysis was performed to determine which variable had the greatest effect on the cost analysis. Variables considered included collector system price per unit area, annual operations and maintenance cost, fuel escalation cost factor, and percent solids in digester feed. The analysis indicated that the collector system cost was the most sensitive item. GRA

N83-14179# State Univ of New York, Buffalo. Dept of Chemistry.

THERMODYNAMICS AND PHOTOELECTROCHEMICAL BEHAVIOR OF THE n-TiO₂ ELECTRODE IN FLUORIDE CONTAINING SOLUTIONS

T. HEPEL, M. HEPEL, and R. A. OSTERYOUNG 1 Sep 1982 54 p refs

(Contract N00014-79-C-0682)

(AD-A119144; SUNYBUF/DC/TR-10) Avail: NTIS HC A04/MF A01 CSCL 07E

Diagrams of the stable and metastable electrochemical equilibria for the system Ti - HF - H₂O at 25 C have been constructed. Increased solubility of titanium dioxide in fluoride containing solutions has been found to occur over a narrow range of solution pH near 3.2. On the basis of the thermodynamic diagrams, appropriate conditions for etching n-TiO₂ semiconductor electrodes were chosen. The etching solutions prepared for the n-TiO₂ semiconductor electrodes showed very good surface-cleansing properties. A photoetching process under anodic bias is recommended for the preparation of the n-TiO₂ surface for the purpose of use in solar energy converters. The doping profile in the space-charge layer which forms during the photoetching treatment is more effective for splitting the electron-hole pair created in a working electrochemical solar cell. Photocurrent-voltage characteristics obtained for n-TiO₂ electrodes in F-solutions do not fit the Butler-Gartner equation, since the

Butler-Gartner equation does not correctly describe photoeffects on medium and heavily doped semiconductor electrodes. From the chronovoltamperometric and coulometric study of the reactions taking place at electrode potentials negative of the flat-band potential, only the first step of the TiO₂ reduction to lower oxides is reversible. Author (GRA)

N83-14665*# Westinghouse Research and Development Center, Pittsburgh, Pa.

LARGE-AREA SHEET TASK ADVANCED DENDRITIC WEB GROWTH DEVELOPMENT Quarterly Report, 24 Oct. - 31 Dec. 1981

C S DUNCAN, R. G. SEIDENSTICKER, J. P. MCHUGH, R. H. HOPKINS, D. MEIER, and J. SCHRUBEN 18 Jun. 1982 23 p refs
Sponsored in part by DOE Prepared for JPL

(Contract JPL-955843)

(NASA-CR-169624, DOE/JPL-955843-82/5; NAS 1.26:169624)

Avail: NTIS HC A02/MF A01 CSCL 10A

The thermal stress model was used to generate the design of a low stress lid and shield configuration, which was fabricated and tested experimentally. In preliminary tests, the New Experimental Web Growth Facility performed as designed, producing web on the first run. These experiments suggested desirable design modifications in the melt level sensing system to improve further its performance, and these are being implemented. Author

N83-14666*# AirResearch Mfg. Co., Los Angeles, Calif.

A HIGH TEMPERATURE CERAMIC HEAT EXCHANGER ELEMENT FOR A SOLAR THERMAL RECEIVER Final Report

H. J. STRUMPF, D. M. KOTCHICK, and M. G. COOMBS 23 Mar. 1982 114 p refs Prepared for JPL

(NASA-CR-169625, NAS 1.26:169625; REPT-81-18452) Avail:

NTIS HC A06/MF A01 CSCL 10A

The development of a high-temperature ceramic heat exchanger element to be integrated into a solar receiver producing heated air was studied. A number of conceptual designs were developed for heat exchanger elements of differing configuration. These were evaluated with respect to thermal performance, pressure drop, structural integrity, and fabricability. The final design selection identified a finned ceramic shell as the most favorable concept. The shell is surrounded by a larger metallic shell. The flanges of the two shells are sealed to provide a leak-tight pressure vessel. The ceramic shell is to be fabricated by an innovative combination of slip casting the receiver walls and precision casting the heat transfer finned plates. The fins are bonded to the shell during firing. The unit is sized to produce 2150 F air at 2.7 atm pressure, with a pressure drop of about 2 percent of the inlet pressure. This size is compatible with a solar collector providing a receiver input of 85 kw(th). Fabrication of a one-half scale demonstrator ceramic receiver was completed. Author

N83-14668*# Solarelectronics, Inc., Bellingham, Mass.

INVESTIGATION OF THE HYDROCHLORINATION OF SiC₁₄ Quarterly Report, 9 Jul. - 8 Oct. 1982

J. Y. P. MUI 15 Oct. 1982 26 p refs Sponsored in part by DOE Prepared for JPL

(Contract JPL-956061)

(NASA-CR-169621; DOE/JPL-956061-5; NAS 1.26:169621; QR-5)

Avail: NTIS HC A03/MF A01 CSCL 10A

The hydrochlorination of SiC₁₄ and m.g. silicon metal to produce SiHC₁₃, was investigated. Reaction kinetic measurements were carried out to collect additional rate data at 525 C and 550 C. A theoretical study was carried out to provide a kinetic model and a rate equation for the hydrochlorination reaction. Results of this preliminary study show that the rate of formation of SiHC₁₃ follows a pseudo first order kinetics. The rate constants were measured at three temperatures, 550 C, 500 C and 450 C, respectively. The activation energy was determined from the Arrhenius plot to give a value of 13.2 Kcal/mole. The design of a quartz reactor to measure reaction rates and equilibrium conversion of SiHC₁₃ at reaction temperature up to 650 C was completed. J.M.S.

N83-14669*# Westinghouse Research and Development Center, Pittsburgh, Pa.
LARGE-AREA SHEET TASK ADVANCED DENDRITIC WEB GROWTH DEVELOPMENT Quarterly Report, 1 Apr. - 30 Jun. 1982

C. S. DUNCAN, R. G. SEIDENSTICKER, J. P. MCHUGH, R. H. HOPKINS, D. MEIER, and J. SCHRUBEN 17 Sep. 1982 40 p refs Sponsored in part by DOE Prepared for JPL (Contract JPL-955843)
 (NASA-CR-169639; DOE/JPL-955843-82/7; NAS 1.26:169639)
 Avail. NTIS HC A03/MF A01 CSCL 10A

The computer code for calculating web temperature distribution was expanded to provide a graphics output in addition to numerical and punch card output. The new code was used to examine various modifications of the J419 configuration and, on the basis of the results, a new growth geometry was designed. Additionally, several mathematically defined temperature profiles were evaluated for the effects of the free boundary (growth front) on the thermal stress generation. Experimental growth runs were made with modified J419 configurations to complement the modeling work. A modified J435 configuration was evaluated. Author

N83-14670*# Clemson Univ., S.C. Dept. of Electrical and Computer Engineering.

INVESTIGATION OF RELIABILITY ATTRIBUTES AND ACCELERATED STRESS FACTORS ON TERRESTRIAL SOLAR CELLS Summary Report

J. W. LATHROP Jun. 1982 91 p refs Sponsored in part by DOE Prepared for JPL (Contract JPL-954929)
 (NASA-CR-169620; DOE/JPL-954929-82/9; NAS 1.26:169620)
 Avail. NTIS HC A05/MF A01 CSCL 10A

The accelerated stress test results obtained on all terrestrial solar cells since the inception of the program are summarized. Tested cells were grouped according to the method used to form the conductive metallization layer: solder dipped, vacuum deposited, screen printed, and copper plated. Although metallization systems within each group were quite similar, they differed in numerous details according to the procedures employed by each manufacturer. Test results were summarized for all cells according to both electrical degradation and catastrophic mechanical changes. These results indicated a variability within each metallization category which was dependent on the manufacturer. Only one manufacturer was represented in the copper plated category and, although these showed no signs of detrimental copper diffusion during high temperature testing, their metallization was removed easily during high humidity pressure cooker testing. Preliminary testing of encapsulated cells showed no major differences between encapsulated and unencapsulated cells when subjected to accelerated testing. Author

N83-14671*# Westinghouse Electric Corp., Pittsburgh, Pa. Advanced Energy Systems Div.

LOW COST SOLAR ARRAY PROJECT CELL AND MODULE FORMATION RESEARCH AREA: PROCESS RESEARCH OF NON-CZ SILICON MATERIAL Quarterly Report, 1 Jun. - 31 Aug. 1982

1981 33 p (Contract JPL-955909)
 (NASA-CR-169632; NAS 1.26:169632; DOE/JPL-955909-82-7; TME-3158; DRL-157; DRD-SE-2; QR-7) Avail. NTIS HC A03/MF A01 CSCL 10A

Liquid diffusion masks and liquid applied dopants to replace the CVD Silox masking and gaseous diffusion operations specified for forming junctions in the Westinghouse baseline process sequence for producing solar cells from dendritic web silicon were investigated. The baseline diffusion masking and drive processes were compared with those involving direct liquid applications to the dendritic web silicon strips. Attempts were made to control the number of variables by subjecting dendritic web strips cut from a single web crystal to both types of operations. Data generated reinforced earlier conclusions that efficiency levels at least as high as those achieved with the baseline back junction

formation process can be achieved using liquid diffusion masks and liquid dopants. The deliveries of dendritic web sheet material and solar cells specified by the current contract were made as scheduled. Author

N83-14673*# Hemlock Semiconductor Corp., Mich.

DEVELOPMENT OF A POLYSILICON PROCESS BASED ON CHEMICAL VAPOR DEPOSITION, PHASE 1 Quarterly Progress Report, 1 Apr. - 30 Jun. 1981

F. PLAHUTNIK, A. ARVIDSON, and D. SAWYER 5 May 1982 25 p refs (Contract JPL-955533)
 (NASA-CR-169633; NAS 1.26:169633; DOE/JPL-955533-81-7; QPR-7) Avail. NTIS HC A02/MF A01 CSCL 10A

The goal of this program is to demonstrate that a dichlorosilane-based reductive chemical vapor deposition (CVD) process is capable of producing, at low cost, high quality polycrystalline silicon. Physical form and purity of this material will be consistent with LSA material requirements for use in the manufacture of high efficiency solar cells. Four polysilicon deposition runs were completed in an intermediate size reactor using dichlorosilane fed from 250 pound cylinders. Results from the intermediate size reactor are consistent with those obtained earlier with a small experimental reactor. Modifications of two intermediate size reactors were completed to interface with the dichlorosilane process demonstration unit (PDU). B.W.

N83-14674*# Ross (Bernd) Associates, San Diego, Calif
DEVELOPMENT OF AN ALL-METAL THICK FILM COST EFFECTIVE METALLIZATION SYSTEM FOR SOLAR CELLS Interim Report, May 1980 - Aug. 1981

B. ROSS and J. PARKER Jul. 1982 92 p refs Sponsored in part by DOE Prepared for JPL (NASA-CR-169635; DOE/JPL-955688-81/5; NAS 1.26:169635; DRD-SE-6; REPT-9950-742) Avail. NTIS HC A05/MF A01 CSCL 10A

Electrodes made with pastes produced under the previous contract were analyzed and compared with raw materials. A needle-like structure observed on the electroded solar cell was identified as eutectic copper-silicon, a phase considered to benefit the electrical and metallurgical properties of the contact. Electrodes made from copper fluorocarbon and copper silver fluoride also contained this phase but had poor adhesion. A liquid medium, intended to provide transport during carbon fluoride decomposition was incorporated into the paste resulting in better adhesion. The product survived preliminary environmental tests. A 2 cm by 2 cm solar cell made with fluorocarbon activated copper electrodes and gave 7% AMI efficiency (without AR coating). Both silver fluoride and fluorocarbon screened paste electrodes can be produced for approximately \$0.04 per watt. A R.H.

N83-14675*# Westinghouse Research and Development Center, Pittsburgh, Pa.

LARGE-AREA SHEET TASK ADVANCED DENDRITIC WEB GROWTH DEVELOPMENT Quarterly Report, 1 Jan. - 31 Mar. 1982

C. S. DUNCAN, R. G. SEIDENSTICKER, J. P. MCHUGH, R. H. HOPKINS, D. MEIER, and J. SCHRUBEN 18 Aug. 1982 28 p refs Sponsored in part by DOE Prepared for JPL (Contract JPL-955843)
 (NASA-CR-169637; DOE/JPL-955843-82/6; NAS 1.26:169637)
 Avail. NTIS HC A03/MF A01 CSCL 10A

The 'discrete shield' temperature model was completed and verified. Modifications to the J419 low stress configuration were tested experimentally to evaluate effects on growth speed. A composite lid and shield configuration combining the low stress features of the J419 with the width limiting characteristics of the J98M3 was fabricated and tested in the N-furnace. Several long crystals were grown with width limited to about 3.3 cm and with melt replenishment, although the configuration is not yet optimized for steady state growth. S.L.

02 SOLAR ENERGY

N83-14676*# Springborn Labs., Inc., Enfield, Conn
INVESTIGATION OF TEST METHODS, MATERIAL PROPERTIES AND PROCESSES FOR SOLAR CELL ENCAPSULANTS

P. B. WILLIS and B. BAUM Jul. 1982 145 p refs Sponsored in part by DOE Prepared for JPL
 (Contract JPL-954527; JPL PROJ. 6072.1)
 (NASA-CR-169636; DOE/JPL-954527-82; NAS 1.26:169636; REPT-9950-744) Avail: NTIS HC A07/MF A01 CSCL 10A

The evaluation of potentially useful low cost encapsulation materials is discussed. The goal is to identify, evaluate, test and recommend encapsulant materials and processes for the production of cost effective, long life solar cell modules. Technical investigations concerned the development of advanced cure chemistries for lamination type potants; the continued evaluation of soil resistant surface treatment, and the results of an accelerated aging test program for the comparison of material stabilities. New compounds were evaluated for efficiency in curing both ethylene/vinyl acetate and ethylene/methyl acrylate potants intended for vacuum bag lamination of solar cells. Two component aliphatic urethane casting syrups were evaluated for suitability as solar module potants on the basis of optical, physical and fabrication characteristics. R.J.F.

N83-14677*# Mobil Tyco Solar Energy Corp., Waltham, Mass
STRESS STUDIES IN EPG Quarterly Progress Report, 9 Jul. - 30 Sep. 1982

15 Oct 1982 17 p refs Sponsored in part by DOE
 (Contract JPL-956312)
 (NASA-CR-169640; DOE/JPL-956312-82/01; NAS 1.26:169640) Avail: NTIS HC A02/MF A01 CSCL 10A

A program to study stress generation mechanisms in silicon sheet growth was started. The purpose of the research is to define post-growth temperature profiles for the sheet that can minimize its stress during growth at high speeds, e.g., greater than 3 cm/min. The initial tasks described concern work in progress toward the development of computing capabilities to (1) model stress-temperature relationships in steady-state ribbon growth, and (2) provide a means to calculate realistic temperature fields in ribbon, given growth system component temperatures as boundary conditions. If it is determined that low stress configurations can be achieved, the modeling is to be tested experimentally by constructing low-stress growth systems for EFG silicon ribbon. Author

N83-14678*# Ford Aerospace and Communications Corp., Palo Alto, Calif. Antenna Engineering Dept
FEASIBILITY STUDY OF SOLID SURFACE SUBREFLECTOR PRODUCTION TECHNIQUES Final Report

15 May 1982 25 p refs Prepared for JPL
 (Contract NAS7-100; JPL-956137)
 (NASA-CR-169642; NAS 1.26:169642; WDL-TR9598) Avail: NTIS HC A02/MF A01 CSCL 10A

The principal effort was to study technical feasibility and cost aspects of the production technique of spin forming a subreflector reflective surface to a desired surface of revolution, back the surface with fiberglass to stabilize it sufficiently so that it may be machined to the target surface tolerance of .008 inches Root Mean Square (RMS) with a goal of .003 inches RMS. To verify this production technique, analyses was performed to define the production procedure. A price estimate for a 150 inch diameter subreflector for a 34 meter cassegrain antenna. During this feasibility study, numerous production processes were evaluated theoretically as production approaches for single surface, non-welded subreflectors. The first successful was the principal process of spin forming the reflective surface, backing with fiberglass and machining to a final contour. The second successful process was spin forming or bump forming a thicker reflective surface, with an integral (welded in) structure as a backing and machining the mounting pads and reflector to a final configuration. B.W.

N83-14679*# Photowatt International, Inc., Tempe, Ariz.
DEVELOPMENT OF TECHNIQUE FOR AIR COATING NICKEL AND COPPER METALLIZATION OF SOLAR CELLS FPS PROJECT PRODUCT DEVELOPMENT Quarterly Technical Report, 1 Apr. - 30 Jun. 1982

W. TAYLOR 15 Jul. 1982 20 p refs Prepared for JPL
 (Contract JPL-955986)
 (NASA-CR-169616; DOE/JPL-955986-3; NAS 1.26:169616; QTR-4) Avail: NTIS HC A02/MF A01 CSCL 10A

Experimental matrices were conducted to determine a suitable firing schedule for fritless tin printing ink. considerable difficulties were encountered with oxidation. Best results were obtained with a firing cycle consisting of 400 C for 20 minutes in nitrogen followed by 5 minutes in air at 500 C. Elimination of oxidizing conditions impaired the adhesion of both tin and copper fritless printing inks, although adhesion of fritless copper inks was obtained when fired in nitrogen with slight oxidation. Author

N83-14680*# **ental matnces were conducted to determine a suitable firing schedule for fritless tin printing ink. considerable difficulties

ANALYSIS OF DEFECT STRUCTURE IN SILICON. CHARACTERIZATION OF SAMPLES FROM UCP INGOT 5848-13C Interim Report

R. NATESH, T. GUYER, and G. B. STRINGFELLOW Aug. 1982 75 p refs
 (Contract JPL-955676)
 (NASA-CR-169617; DOE/JPL-955676-2; NAS 1.26:169617; MRI-290) Avail: NTIS HC A04/MF A01 CSCL 10A

Statistically significant quantitative structural imperfection measurements were made on samples from ubiquitous crystalline process (UCP) Ingot 5848 - 13 C. Important trends were noticed between the measured data, cell efficiency, and diffusion length. Grain boundary substructure appears to have an important effect on the conversion efficiency of solar cells from Semix material. Quantitative microscopy measurements give statistically significant information compared to other microanalytical techniques. A surface preparation technique to obtain proper contrast of structural defects suitable for QTM analysis was perfected. S.L.

N83-14681*# Underwriters Labs., Inc., New York.
DEVELOPMENT OF PHOTOVOLTAIC ARRAY AND MODULE SAFETY REQUIREMENTS Final Report

Jun. 1982 155 p refs Sponsored in part by DOE Prepared for JPL
 (Contract JPL-955392)
 (NASA-CR-169641; DOE/JPL-955392-1; NAS 1.26:169641) Avail: NTIS HC A08/MF A01 CSCL 10A

Safety requirements for photovoltaic module and panel designs and configurations likely to be used in residential, intermediate, and large-scale applications were identified and developed. The National Electrical Code and Building Codes were reviewed with respect to present provisions which may be considered to affect the design of photovoltaic modules. Limited testing, primarily in the roof fire resistance field was conducted. Additional studies and further investigations led to the development of a proposed standard for safety for flat-plate photovoltaic modules and panels. Additional work covered the initial investigation of conceptual approaches and temporary deployment, for concept verification purposes, of a differential dc ground-fault detection circuit suitable as a part of a photovoltaic array safety system. R.J.F.

N83-14682*# Solarelectronics, Inc., Bellingham, Mass.
INVESTIGATION OF THE HYDROCHLORINATION OF SICL4 Quarterly Report, 9 Apr. - 8 Jul. 1982

J. Y. P. MUI 12 Apr. 1982 38 p refs Sponsored in part by DOE Prepared for JPL
 (Contract NAS7-100; JPL-956061)
 (NASA-CR-169622; DOE/JPL-956061-4; NAS 1.26:169622; QR-4) Avail: NTIS HC A03/MF A01 CSCL 10A

Reaction kinetic measurements on the hydrochlorination of SiCl₄ and metallurgical grade (m.g.) silicon metal were made at a wide range of experimental variables. The effect of pressure on

the reaction rate was studied at 25 psig, 100 psig, 150 psig and 200 psig, respectively. Results of these experiments show a large pressure effect on the hydrochlorination reaction. As expected, higher pressures produce a higher equilibrium SiHC13 conversion, since the hydrochlorination reaction results in a net volume contraction as product SiHC1 is formed. However, the reaction rate, namely, the rate at which the hydrochlorination reaction reaches its equilibrium SiHC13 conversion, was found to be much faster at low pressures. Author

N83-14685*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

ADVANCED CZOCHRALSKI SILICON GROWTH TECHNOLOGY FOR PHOTOVOLTAIC MODULES

T. DAUD and A. H. KACHARE 15 Sep. 1982 40 p refs Sponsored by NASA

(Contract DE-AI01-76ET-20356)

(NASA-CR-169661; DOE/JPL-1012-70; JPL-PUB-82-35;

JPL-5101-207; NAS 1.26:169661) Avail: NTIS HC A03/MF A01 CSCL 10A

Several economic analyses had indicated that large-diameter, multiple ingot growth using a single crucible with melt replenishment would be required for Cz growth to be economically viable. Based on the results of these analyses, two liquid and two solid feed melt replenishment approaches were initiated. The sequential solid feed melt replenishment approach, which demonstrated elements of technical feasibility is described in detail in this paper. Growth results of multiple ingots (10-cm-diameter, totaling 100 kg; and 15-cm-diameter, totaling 150 kg weight per crucible) are presented. Solar cells were fabricated and analyzed to evaluate the effects of structure and chemical purities as a result of multiple growth. The results indicate that, with semiconductor-grade silicon, feedstock impurity build-up does not seem to degrade cell performance. For polycrystalline cells, the average efficiencies are 15 to 25% lower than those of single crystalline cells. Concerns regarding single crystal yields, crucible quality and growth speed are indicated, and present status and future research thrusts are also discussed. Author

N83-14686*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

DISTRIBUTED PHOTOVOLTAIC SYSTEMS: UTILITY INTERFACE ISSUES AND THEIR PRESENT STATUS. INTERMEDIATE/THREE-PHASE SYSTEMS

R. L. DAS, J. W. KLEIN, and T. W. MACIE 15 Sep. 1982 106 p refs Sponsored by NASA and DOE Prepared for Sandia Labs., Albuquerque, N. Mex.

(NASA-CR-169664; JPL-PUB-82-63; NAS 1.26:169664) Avail.

NTIS HC A06/MF A01 CSCL 10A

The interface issues between the intermediate-size Power Conditioning Subsystem (PCS) and the utility are considered. A literature review yielded facts about the status of identified issues. Author

N83-14687*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

SOLAR CELL RADIATION HANDBOOK

H. Y. TADA (TRW, Inc., Cleveland), J. R. CARTER, JR. (TRW, Inc., Cleveland), B. E. ANSPAUGH, and R. G. DOWNING 1 Nov. 1982 403 p refs

(NASA-CR-169662; JPL-PUB-82-69; NAS 1.26:169662) Avail:

NTIS HC A18/MF A01 CSCL 10A

The handbook to predict the degradation of solar cell electrical performance in any given space radiation environment is presented. Solar cell theory, cell manufacturing and how they are modeled mathematically are described. The interaction of energetic charged particles radiation with solar cells is discussed and the concept of 1 MeV equivalent electron fluence is introduced. The space radiation environment is described and methods of calculating equivalent fluences for the space environment are developed. A computer program was written to perform the equivalent fluence calculations and a FORTRAN listing of the program is included.

Data detailing the degradation of solar cell electrical parameters as a function of 1 MeV electron fluence are presented. E.A.K.

N83-14692* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

HEAT TRANSPARENT HIGH INTENSITY HIGH EFFICIENCY SOLAR CELL Patent

J. C. EVANS, JR., inventor (to NASA) 15 May 1981 7 p Filed 15 May 1981 Supersedes N81-27598 (19 - 18, p 2506)

(NASA-CASE-LEW-12892-1; US-PATENT-4,360,701;

US-PATENT-APPL-SN-264380; US-PATENT-CLASS-136-259;

US-PATENT-CLASS-136-255; US-PATENT-CLASS-136-256)

Avail: US Patent and Trademark Office CSCL 10A

An improved solar cell design is described. A surface of each solar cell has a plurality of grooves. Each groove has a vertical face and a slanted face that is covered by a reflecting metal. Light rays are reflected from the slanted face through the vertical face where they traverse a photovoltaic junction. As the light rays travel to the slanted face of an adjacent groove, they again traverse the junction. The underside of the reflecting coating directs the light rays toward the opposite surface of solar cell as they traverse the junction again. When the light rays travel through the solar cell and reach the saw toothed grooves on the under side, the process of reflection and repeatedly traversing the junction again takes place. The light rays ultimately emerge from the solar cell. These solar cells are particularly useful at very high levels of insolation because the infrared or heat radiation passes through the cells without being appreciably absorbed to heat the cell.

Official Gazette of the U.S. Patent and Trademark Office

N83-14694# European Space Agency, Paris (France)

PHOTOVOLTAIC GENERATORS IN SPACE

W. R. BURKE, comp Jun. 1982 331 p refs Partly in ENGLISH and FRENCH Proc. of 3rd European Symp. Bath, England, 4-6 May 1982; sponsored in cooperation with UK Dept. of Industry and RAE

(ESA-SP-173; ISSN-0379-6566) Avail. NTIS HC A15/MF A01

Solar array design and testing were discussed. Radiation damage, blankets, solar cells, and the status of NASA and ESA spacecraft solar energy development programs were considered.

N83-14695*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

THE SWING TO CONCENTRATOR ARRAYS

J. L. MILLER /In ESA Photovoltaic Generators in Space p xix-xxiv Jun. 1982 refs

Avail. NTIS HC A15/MF A01 CSCL 10A

Objectives and progress in both low concentration ratio (6 to 10) and high concentration ratio (100) array developments are summarized. Problems encountered include: thermal control, maldistribution of concentrated sunlight, current busing, and optical surface degradation. The potential advantages over planar arrays are an order of magnitude reduction in per unit cost of power plus increased immunity to radiation damage. Author (ESA)

N83-14696# AEG-Telefunken, Wedel (West Germany).

LOW EARTH ORBIT BLANKET TECHNOLOGIES FOR THE POWER RANGE OF 15-60 KW

H. BEBERMEIER /In ESA Photovoltaic Generators in Space p 3-7 Jun. 1982 refs

Avail: NTIS HC A15/MF A01

The development of a 3.2 x 50 m foldable solar array is discussed. The blanket skin has a homogeneous rear side wiring of copper. A very thin foil is bonded onto the rear side of the glass fiber reinforced Kapton, giving extremely high in-plane and out-of-plane stiffness of the array compared to present technology. Metallic foil is also used to reinforce the hinge cusp and foldline cusp. The bending stiffness over the width of the array is optimized by the height and shape of the cusp and its reinforcement. Silicon or embossed Kapton damping cross elements (padding) placed in the solar cell corner gap, come down onto the center of the adjacent cell during retraction. A 5 x 5 cm silicon cell with back surface is used. Author (ESA)

02 SOLAR ENERGY

N83-14697# Royal Netherlands Aircraft Factories Fokker, Amsterdam.

ADVANCED RIGID ARRAY

D. MAWIRA /in ESA Photovoltaic Generators in Space p 9-14 Jun. 1982 refs

Avail: NTIS HC A15/MF A01

The development of an advanced rigid solar array designed to provide powers from 2 to 6 kW for medium class communications satellites is described. For satellites with single axis Sun tracking solar arrays, a rigid structure is suitable. A 50/50 percentage weight proportion, using back surface reflector/back surface field 100 microns solar cells, is possible. No interference problems are expected for the electrical system design. Author (ESA)

N83-14698# AEG-Telefunken, Wedel (West Germany). Neue Technologien.

MODULE TECHNIQUE OF 5 X 5 CM(2) SOLAR CELLS

J. KOCH /in ESA Photovoltaic Generators in Space p 17-21 Jun. 1982 refs Sponsored by Bundesministerium fuer Forschung und Technologie

Avail: NTIS HC A15/MF A01

Investigations of cover glass bonding, contact welding, interconnection design and solar cell laydown to substrates are summarized. The module technique for 5 x 5 cm cells is characterized by 100 micron thick space qualified cover glasses (microsheet and fused silica) and interconnectors with stress reliefs in an out of plane and an inplane configuration. Thermal cycle tests prove the applicability of 5 x 5 cm cell module techniques on solar arrays. Author (ESA)

N83-14699*# National Aeronautics and Space Administration Lewis Research Center, Cleveland, Ohio.

LARGE AREA LOW-COST SPACE SOLAR CELL DEVELOPMENT

C. R. BARONA and J. L. CIONI (NASA. Johnson Space Center) /in ESA Photovoltaic Generators in Space p 23-26 Jun. 1982 refs

Avail: NTIS HC A15/MF A01 CSCL 10A

A development program to produce 5.9 x 5.9 cm space quality silicon solar cells with a cost goal of 30 \$/W is described. Cell types investigated include wraparound dielectric, mechanical wraparound and conventional contact configurations with combinations of 2 or 10 ohm/cm resistivity, back surface reflectors and/or fields, and diffused or ion implanted junctions. A single step process to cut cell and cover glass simultaneously is being developed. Results for cell and array tests are given. Large solar arrays that might use cells of this type are discussed.

Author (ESA)

N83-14700# ETSI Telecomunicacion, Barcelona (Spain)

NONLINEAR ALGORITHMS APPLICATION TO IRRADIATED SOLAR CELL PARAMETERS EVALUATION

J. CABESTANY and L. CASTANER /in ESA Photovoltaic Generators in Space p 27-33 Jun. 1982 refs

Avail: NTIS HC A15/MF A01

A method which calculates the parameters of solar cell equivalent circuits is presented. The method is based on the definition of an object function of the difference between the experimental I(V) curve and the model. The object function is found to be nonlinear, so algorithms have to be used to find a solution that optimizes this function. Least mean square and minimax both give good results. A method to find an initial solution, critical in the time calculations of the routine, is also described. The parameters of proton irradiated solar cells were calculated.

Author (ESA)

N83-14701# Katholieke Universiteit te Leuven (Belgium). Lab. ESAT.

LIFT OFF: A VERY FINE FRONT METALLIZATION GEOMETRY TECHNIQUE FOR HIGH EFFICIENCY SOLAR CELLS

J. NIJS, F. DHOORE, R. MERTENS, and R. VANOVERSTRAETEN /in ESA Photovoltaic Generators in Space p 37-42 Jun. 1982 refs Sponsored by Belgium National Research and Development Program of Energy (Contract EEC-153-77-9ESB)

Avail: NTIS HC A15/MF A01

A lift off technique for TiPdAg metallization is described. A photoresist pattern is used before evaporation of the metal. After the metal is evaporated, the photoresist is removed, lifting off the metal on top of it. Where the photoresist was already removed before metallization with developing, the metal remains on the wafer. There must be a discontinuity in the metal due to the photoresist pattern, so that the dissolvent can reach the resist itself or the steps in the photoresist pattern may only be covered with a very thin layer of metal when the technique is used in an ultrasonic medium. Fingers of 10 microns width and 3 microns thickness are obtained, resulting in an optimized trade-off between metal coverage and series resistance. Silicon solar cells with AM1 efficiencies 17% are obtained. Author (ESA)

N83-14702# Spectrolab, Inc., Sylmar, Calif.

THIN CELL DEVELOPMENT AND TESTING

J. FODOR and N. NEAL /in ESA Photovoltaic Generators in Space p 43-50 Jun. 1982

Avail: NTIS HC A15/MF A01

Over 200 silicon cells, 62 microns thick, with average AMO efficiencies of 13.5% were used in the fabrication of 10 lightweight modules featuring flexible substrates, welded interconnects, and thin coverslides (100 microns). The ability of these five cells in series by three cells in parallel modules to survive the space environment was proven by subjecting modules to acoustic and thermal cycle testing typical of planned geosynchronous missions.

Author (ESA)

N83-14703# AEG-Telefunken, Heilbronn (West Germany)

A FAMILY OF THIN HIGH EFFICIENCY SILICON SOLAR CELLS

K. D. RASCH, K. ROY, K. H. TENTSCHER, and D. GRINGEL /in ESA Photovoltaic Generators in Space p 51-56 Jun 1982 refs Sponsored by Bundesministerium fuer Forschung und Technologie

Avail: NTIS HC A15/MF A01

Ultrathin (50 micron) and thin (100 and 150 micron) silicon solar cells were produced. The matrix contains cells with back surface reflector (BSR) and back surface field (BSF). The beginning of life (BOL) electrical output and the cell performance after electron irradiation up to 1 MeV and post photon irradiation testing as a function of thickness and base material (1 ohm-cm float zone and 10 ohm-cm crucible grown (CG) boron doped silicon) are presented. The ultrathin BSFR cell is the only cell that shows the advantage of BSF beyond 1MeV. In respect to cost and yield, non-BSF cells with an optimized BSR in the range of 100 to 150 microns are attractive for high fluence level missions. Besides the thermal advantage, the BSR in conjunction with diffused BSF shows benefits after electron radiation due to the photovoltaic effects of BSR. The FZ cells show the lowest EOL power output as a result of photon induced degradation. Nevertheless, these cells can be as attractive as a high EOL open-circuit voltage device, if the problem of photon degradation can be solved. Author (ESA)

N83-14704# Thorn EMI, Hayes (England). Central Research Labs.

ELECTROPHORETED CDS/CU₂S SOLAR CELLS FOR SPACE APPLICATIONS

E. W. WILLIAMS, D. J. GIBBONS, T. J. CUMBERBATCH, I. D. MCINALLY, and M. CLAYBOURN */n* ESA Photovoltaic Generators in Space p 57-61 Jun. 1982 refs

Avail: NTIS HC A15/MF A01

Both CdS and Cu₂S were deposited by a process which uses ammonium sulphide instead of hydrogen sulphide. Cracking is a problem on films with a thickness above 1.5 microns. In space grain size problems should be eliminated as calculations show that particle sizes 0.5 microns can be used in the colloids compared to 0.02 microns for terrestrial colloids. Another problem is oxygen inclusion at the anode due to the lack of buoyancy of the bubbles formed in the water/methanol mixtures. However, high methanol contents reduce bubble concentrations. These photovoltaic junctions could be easily prepared in a long life solar breeder spacecraft. Tests of annealing with a pulsed dye laser indicate that photovoltages of 400mV can be produced from copper dipped CdS films.

Author (ESA)

N83-14705*# National Aeronautics and Space Administration Lewis Research Center, Cleveland, Ohio.

ON THE CAUSE OF THE FLAT-SPOT PHENOMENON OBSERVED IN SILICON SOLAR CELLS AT LOW TEMPERATURES AND LOW INTENSITIES

V. G. WEIZER, J. D. BRODER, H. W. BRANDHORST, and A. F. FORESTIERI */n* ESA Photovoltaic Generators in Space p 65-70 Jun. 1982 refs

Avail: NTIS HC A15/MF A01 CSCL 10A

A model that explains the flat-spot power loss phenomenon is presented. Evidence suggests that the effect is due to localized metallurgical interactions between the silicon substrate and the contact metallization. These reactions are shown to result in localized regions in which the P-N junction is destroyed and replaced with a metal semiconductor-like interface. The effects of thermal treatment, crystallographic orientation, junction depth, and metallization are shown along with a method of preventing the effect through the suppression of vacancy formation at the free surface of the contact metallization. Data indicating the effectiveness of a TiN diffusion barrier in preventing the effect are also given.

Author (ESA)

N83-14706# AEG-Telefunken, Heilbronn (West Germany). Electronic Components Div.

ASPECTS OF END OF LIFE DESIGN FOR SOLAR CELLS

R. SCHILLING, K. D. RASCH, and K. ROY */n* ESA Photovoltaic Generators in Space p 71-75 Jun. 1982 refs

Avail: NTIS HC A15/MF A01

The power performances before and after electron irradiation of solar cells with different short wavelength responses and of solar cells with material or process induced low initial power output are represented. From a 10 ohm-cm crucible grown boron doped crystal, high efficiency solar cells with different shallow junctions and with different reflection minima were produced. Standard high efficiency solar cells were obtained from the same crystal with simulated process failure and from a second crystal with low carrier lifetime. Short circuit current and maximum power were measured after fabrication and after 1 MeV electron irradiation of fluences of 2 times 10 to the 14th and 1 times 10 to the 15th power/sqcm. High initial power optimized solar cells change to lower values after electron irradiation in contrast to the cells with lower initial power but high short wavelength response. It is demonstrated that after electron irradiation the power decrease of cells with material or process induced low initial power is smaller compared with reference cells.

Author (ESA)

N83-14707# Technische Universitaet, Brunswick (West Germany). Inst. fuer Raumflugtechnik und Reaktortechnik.

OPTIMIZATION OF SILICON SOLAR CELLS FOR SOLAR GENERATORS WITH CONCENTRATION

W. D. EBELING and D. REX */n* ESA Photovoltaic Generators in Space p 77-85 Jun. 1982 refs

Avail: NTIS HC A15/MF A01

Solar cell optimization by changing the contact grid pattern and the thickness of the n-layer in order to reduce the electrical series resistance, and by changing the thickness of the antireflective coating in order to adjust it to the inclined irradiation are discussed. A mathematical model of silicon solar cells by which the optimal solar cell type can be designed individually for each concentration system is presented. Such optimized solar cells can produce 18% more power than conventional cells in the concentrating system SARA

Author (ESA)

N83-14708*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

EFFECTS OF PROCESSING AND DOPANT ON RADIATION DAMAGE REMOVAL IN SILICON SOLAR CELLS

I. WEINBERG, H. W. BRANDHORST, C. K. SWARTZ, and S. MEHTA */n* ESA Photovoltaic Generators in Space p 89-93 Jun. 1982 refs

Avail: NTIS HC A15/MF A01

Gallium and boron doped silicon solar cells, processed by ion implantation followed by either laser or furnace anneal were irradiated by 1 MeV electrons and their postirradiation recovery by thermal annealing was determined. During the postirradiation anneal, gallium doped cells prepared by both processes recovered more rapidly and exhibited none of the severe reverse annealing observed for similarly processed 2 ohm-cm boron doped cells. Ion implanted furnace annealed 0.1 ohm-cm boron doped cells exhibited the lowest post-irradiation annealing temperatures after irradiation. The drastically lowered recovery temperature is attributed to the reduced oxygen and carbon content of the 0.1 ohm-cm cells. Analysis based on defect properties and annealing kinetics indicates that further reduction in annealing temperature is attainable with further reduction in the silicon's carbon and/or divacancy content after irradiation.

Author (ESA)

N83-14709# Royal Aircraft Establishment, Farnborough (England). Space and New Concepts Dept.

OMNIDIRECTIONAL PROTON RADIATION OF THIN AND THICK SOLAR CELLS

M. W. WALKDEN */n* ESA Photovoltaic Generators in Space p 95-102 Jun. 1982 refs

Avail: NTIS HC A15/MF A01

Proton damage ratios, relating the damage caused by 1 MeV electrons to that caused by protons of various energies, were found for hemispherical isotropic proton conditions. The proton fluences were incident on either the front or rear of the cell. Six types of cell ranging in thickness from 50 to 250 microns were used. The ratios are much higher than those derived in earlier studies where normal incidence protons were employed, although the differences are offset by the cell cover glass or rear shield. Results are compared with proton maps AP6 and AP8.

Author (ESA)

N83-14710# Centre National de la Recherche Scientifique, Toulouse (France). Lab. d'Automatique et d'Analyse des Systemes

THE REDUCTION OF RADIATION DAMAGE IN SPACE SOLAR CELLS. A STUDY OF RADIATION DEFECTS IN SILICON (+)

D. BIELLE-DASPET, J. BOURGOIN (Paris Univ. VII), J. BERNARD (ONERA, Toulouse), L. CASTANER-MUNOZ (ETSI Telecomunicacion), L. PRATT (ESTEC, Noordwijk, Netherlands), and R. L. CRABB */n* ESA Photovoltaic Generators in Space p 103-108 Jun. 1982 refs

(Contract ESTEC-4510/80/NL-JS(SC))

Avail: NTIS HC A15/MF A01

Research data on space environmental flux and simulation conditions; electron and photon induced defects; measurement

02 SOLAR ENERGY

techniques for correlated study of the microscopic macroscopic and global (electrical) degradation of the solar cell; and numerical models for space cell and degradation prediction were reviewed. The survey indicates that space factors must include possible contributions of solar flare protons, photon effects and thermal annealing due to the insolation and temperature cycles of the solar generators. An adapted set of measurement techniques must be used in order to obtain comprehensive characterization of defect and solar-cell behavior. In numerical models of solar cell electrical behavior and degradation, cell structure as well as defect and carrier properties must be introduced. In space, P-type silicon should behave better than N-type; lithium in N-type gives improvement only in particular cases, and photon degradation seems to be related to boron doping when carbon and oxygen content are simultaneously low. Author (ESA)

N83-14711# Southampton Univ. (England). Faculty of Mathematical Sciences.

ELECTRON AND PHOTON DEGRADATION OF BORON DOPED FZ SILICON SOLAR CELLS

T. MARKVART, T. J. CUMBERBATCH (Thorn-EMI), M. W. WALKDEN (RAE, Farnborough, Engl.), and A. A. DOLLERY. In ESA Photovoltaic Generators in Space p 109-114 Jun. 1982 refs. Sponsored by SRC

Avail: NTIS HC A15/MF A01

The short circuit current of cells damaged by electron irradiation and post-electron illumination was analyzed. It is shown that the electron damage coefficient of the cells is inversely proportional to the base resistivity, in the range 0.3 to 115 ohm-cm. Photon degradation (characterized by the ratio r identical with $K \text{ ph/Kel} = \text{Sigma ph/Sigma el}$, where $K \text{ ph}$ and $K \text{ el}$ are functions of the base resistivity, and describe the resistivity dependence of photon and electron degradation) displays a more complicated resistivity dependence. This is explained in terms of illumination-induced defect reaction whose rate depends on the charge states of the reactants. Author (ESA)

N83-14712# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany).

RETROSPECT OF SOLAR CELL DEVELOPMENT IN WEST GERMANY

H. R. LOESCH. In ESA Photovoltaic Generators in Space p 117-120 Jun. 1982

Avail: NTIS HC A15/MF A01

Solar cell development in West Germany from 1963 onwards is described. Author (ESA)

N83-14713*# National Aeronautics and Space Administration, Washington, D. C.

NASA SPACE PHOTOVOLTAIC RESEARCH AND TECHNOLOGY PROGRAMS

J. P. MULLIN and D. J. FLOOD. In ESA Photovoltaic Generators in Space p 121-126 Jun. 1982

Avail: NTIS HC A15/MF A01

The NASA programs for increasing conversion efficiency, reduced mass and cost, and extending operating life of photovoltaic converters and arrays and for evaluating advanced solar array concepts are outlined. Research into radiation resistance and annealing, development of thin blankets, high-power low-cost arrays, and lightweight structures for near-Earth and planetary applications are discussed. Author (ESA)

N83-14714# Societe Nationale Industrielle Aerospatiale, Cannes (France).

TV-SAT SOLAR ARRAY

G. URBAIN, C. RINN, and J. L. BASTARD. In ESA Photovoltaic Generators in Space p 129-133 Jun. 1982 refs

Avail: NTIS HC A15/MF A01

The electrical and mechanical performance of the TV-SAT direct television broadcasting satellite is described. The 4.5 kW end of life 7.5yr array contains 43,200 back surface reflector solar cells. The first, 3.1 kW, array consists of two identical wings, providing power during transfer and geostationary orbit. Each wing is made

up of four carbon fiber panels. The outboard panel of each wing is deployed at 90 deg in transfer orbit, during which the satellite is three axis stabilized. Author (ESA)

N83-14715# Royal Netherlands Aircraft Factories Fokker, Schiphol-Oost. Space Div.

FURTHER DEVELOPMENTS OF THE ECS SOLAR ARRAY

A. VIELEERS and F. ZIJDEMANS. In ESA Photovoltaic Generators in Space p 135-140 Jun. 1982 refs

Avail: NTIS HC A15/MF A01

The ECS/MARECS communications satellite modular solar array is described. The baseline array configuration provides 1000 W at 50 V for a minimum lifetime of 1 yr for ECS. The array consists of two wing assemblies, each having three identical panels hinged together and connected to the spacecraft via a yoke. The lightweight panel substrates are of the rigid sandwich concept; 2240 solar cells are bonded onto each of the rectangular panels. The electrical baseline design configurations matches requirements of a regulated bus. No special battery charge sections are allocated. The power generating element is a 10 ohm-cm shallow diffused 20.95 x 40.35 mm high efficiency solar cell of 180 micron nominal thickness. Power-weight ratio is 26W/kg. Communication and scientific satellite applications are described. Author (ESA)

N83-14716# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Space Operations Center.

PRELIMINARY RESULTS OF HELIOS SOLAR GENERATOR INFLIGHT PERFORMANCE EVALUATION

J. KEHR and H. PORSCHE. In ESA Photovoltaic Generators in Space p 143-147 Jun. 1982 refs

Avail: NTIS HC A15/MF A01

A technique which assesses the Helios 1 solar generator degradation by calculating equivalent flux from data measured in flight is presented. The degradation is normalized to the 0.985 AU regulator output power value of 214 W. The measured aphelion points summarize the degradation of one orbit. Nonmeasured points are linearly interpolated. Through 14 orbits, the solar generator degraded to 37.5% of its original performance. In order to separate solar cell radiation introduced degradation of the substrate from other effects, the particle intensities as measured by Helios experiments are converted to 1 MeV equivalent fluxes using damage coefficients. The temperature increase of the solar panels at the aphelion points can be related to the loss of light intensity arriving at the substrate because the absorbed intensity is approximately proportional to temperature according to Kirchhoff's law. Author (ESA)

N83-14717# European Space Research and Technology Center, Noordwijk (Netherlands).

PRIMARY CALIBRATION OF HIGH EFFICIENCY SOLAR CELLS. A COMPARISON OF 1980 DATA FROM CNES, NASA (LEWIS), JPL AND RAE

R. L. CRABB. In ESA Photovoltaic Generators in Space p 149-155 Jun. 1982 refs

Avail: NTIS HC A15/MF A01

Calibration results are presented for 10 high efficiency n/p, 1 ohm-cm, 2x4cmx250 microns silicon solar cells embodying TiPdAg contacts, TiOx antireflection coatings and 150 microns thick cerium doped microsheet coverslides. Three cells were calibrated by NASA on a high altitude aircraft, two cells by CNES balloon, two cells by JPL balloon and four cells by RAE at sea level. All data points fell within a band of + or - 1% spread in short circuit current.

Author (ESA)

N83-14718# Societe Europeenne de Propulsion, Vernon (France).

DEVELOPMENT AND TESTING OF A SPACECRAFT SURFACE POTENTIAL MONITOR

D. VALENTAN, L. LEVY (ONERA, Toulouse), D. SARRAIL (ONERA, Toulouse), and J. C. LARUE (ESTEC, Noordwijk, Netherlands) *In* ESA Photovoltaic Generators in Space p 157-160 Jun. 1982

Avail: NTIS HC A15/MF A01

A surface potential monitor was developed in order to measure the electrostatic fields in solar cell covers. The measurement correlates electrostatic discharges occurring during geomagnetic substorm events and spacecraft disturbance. Monitor output can be used to drive an active spacecraft charging control system. An electromagnet induces vibration of a flat spring holding the sensing area. The spring oscillates at its fundamental frequency. Spring and sensing area mounted on an insulator. The resulting signal feeds a charge amplifier through a coaxial cable. A high impedance ac voltmeter can also be used. The monitor is designed to withstand geostationary environment for 7 yr. The test program includes environmental acceptance tests, functional acceptance tests under vacuum then environmental tests at qualification level, and geomagnetic substorm simulation tests. Author (ESA)

N83-14719# European Space Agency, Paris (France).
ANNOUNCEMENT OF AN OPPORTUNITY FOR SPACE CALIBRATION OF SOLAR CELLS

E. G. SUPPA *In its* Photovoltaic Generators in Space p 161-163 Jun. 1982

Avail: NTIS HC A15/MF A01

The ESA solar cell calibration facility (SCCE) is described. The SCCE will operate regularly on shuttle pallet satellites. Specimen reference number short circuit current, open circuit voltage, and the temperature of experiment electronics are recorded for up to 32 cells. Overall measurement accuracy is better than + or - 1%. Author (ESA)

N83-14720# European Space Research and Technology Center, Noordwijk (Netherlands).

LARGE INFRARED TEST RIG FOR VACUUM TEMPERATURE CYCLING TESTS IN THE ESTEC DTC

P. BONNOT and P. W. BRINKMANN *In* ESA Photovoltaic Generators in Space p 165-172 Jun. 1982 refs

Avail: NTIS HC A15/MF A01

A rig for testing six INTELSAT 5 solar panels simultaneously was developed. It has three vertical rectangular LN2 shroud systems, which form two adjacent compartments, each 70 cm wide. Three solar panels can be suspended on rails in each compartment. The panels are almost completely enclosed by the shrouds, so that rapid transients can be achieved during temperature cycling. The solar panels are heated by an array of IR lamps in each compartment. The intensity distribution in the plane of the solar panels meets the required uniformity of + or - 10%. Mechanical interfaces are designed to allow easy adaptation to other programs. Author (ESA)

N83-14721# Physikalisch-Technische Studien G.m.b.H., Freiburg (West Germany).

LOSS CURRENTS OF SOLAR CELLS UNDER LOW EARTH ORBIT (LEO) CONDITIONS

G. STASEK *In* ESA Photovoltaic Generators in Space p 173-177 Jun. 1982 refs

Avail: NTIS HC A15/MF A01

Loss currents through plasma for different solar cell samples were measured as a function of the potential difference, distance and angle against the plasma stream, in a plasma chamber. Loss currents of 2 micro A at 200 V for a solar panel, and a lower limit for typical discharge voltages of about 200 to 300 V for solar cells are reported. Dependencies of these quantities and test results show that current and discharge voltage are governed principally by the available charged particle densities, especially electrons, and the active sample surface. The area of these surfaces determines the current in the ohmic region whereas their geometry

(edges, tips) governs the discharge voltage. In the discharge region secondary electron production increases the current.

Author (ESA)

N83-14722*# National Aeronautics and Space Administration, Marshall Space Flight Center, Huntsville, Ala.

NASA SOLAR ARRAY FLIGHT EXPERIMENT Progress Report
G. TURNER (LMSC, Sunnyvale, Calif.) and H. HILL *In* ESA Photovoltaic Generators in Space p 179-184 Jun. 1982

Avail: NTIS HC A15/MF A01

The NASA large flexible solar array space shuttle flight experiment is described. The 32 x 4 m wing is deployed from the shuttle bay, and experiments in electrical output, multiple deployment, and structural dynamics are planned. Both 2 x 4 cm and 5.9 x 5.9 cm cell assemblies on the array blanket are evaluated. Safety/hazards provisions are described, including emergency jettison provisions. Ground testing and hardware fabrication are summarized. Author (ESA)

N83-14723# AEG-Telefunken, Wedel (West Germany).
ANALYTICAL PREDICTION OF THE DYNAMIC IN-ORBIT BEHAVIOR OF LARGE FLEXIBLE SOLAR ARRAYS

G. BEHRENS *In* ESA Photovoltaic Generators in Space p 187-192 Jun. 1982 refs

Avail: NTIS HC A15/MF A01

The natural motions in terms of eigenfrequencies and modes of large flexible solar arrays were determined by the finite element method (FEM). The accuracy of the FE-model was verified and improved by static and dynamic analyses. Good agreement with flight test data was established. Author (ESA)

N83-14724# European Space Agency, Noordwijk (Netherlands).
SPACE TELESCOPE: SOLAR PANEL ASSEMBLY THERMAL TEST ANALYSIS

E. K. JAEKEL, G. I. M. BEERE, and B. G. M. AALDERS *In its* Photovoltaic Generators in Space p 193-200 Jun. 1982 refs

Avail: NTIS HC A15/MF A01

The Space Telescope solar panel assembly (ST-SPA) was tested in a thermal vacuum, for formal qualification and design verification of the SPA including the shunt diodes. The ST-SPA was instrumented with 60 thermocouples and 2 thermistors. In parallel to the thermal sensor readings, thermograms with an infrared camera were taken. Thermograms are reproduced, and updates of the thermal mathematical models are given. The use of a calibrated solar flux allowed an update of the thermo-optical properties for the SPA. Optical properties are: alpha S = 0.53, Sigma H = 0.76 for the rear side; and alpha S = 0.86, Sigma H = 0.78 (unloaded) for the front. Solar cell and shunt diode temperature for flight environments are included. Author (ESA)

N83-14725# Royal Netherlands Aircraft Factories Fokker, Schiphol-Oost. Space Div.

EXTENDIBLE AND RETRACTABLE MASTS FOR SOLAR ARRAY DEVELOPMENTS

A. M. V. VIELEERS and P. R. PREISWERK (Astro Research Corp.) *In* ESA Photovoltaic Generators in Space p 201-207 Jun. 1982 refs

Avail: NTIS HC A15/MF A01

The Astromast instrument boom, and its applications in European and American space programs (e.g., L-Sat, Voyager) are described. In the continuous version the longitudinal beams (longerons) are elastically coiled when in their stowed configuration. In the articulated version the longerons are segmented and hinged, and are folded when in stowed configuration. For fully automated array deployment, the Astromast provides actuation and drive for articulations of the stowage boxes from their stowed position to the array deployment position, actuation and drive for release and reapplication of blanket preload pressure, and deployment and retraction of the solar array wing. Author (ESA)

02 SOLAR ENERGY

N83-14726# Pilkington Bros Ltd, Ormskirk (England).
CMX-50: A NEW ULTRA THIN SOLAR CELL COVER FOR LIGHTWEIGHT ARRAYS

H. TAYLOR, A. F. SIMPSON, and A. A. DOLLERY (RAE, Farnborough, England) /n ESA Photovoltaic Generators in Space p 211-214 Jun. 1982 refs
Avail: NTIS HC A15/MF A01

Developments which extend the available thickness range of cerium glass solar cell covers down to 0.050 mm are described. A continuous draw process offers a high volume, low cost solar cell cover material to integrate with thin silicon solar cells for the assembly of large area lightweight solar arrays. The cell covers are manufactured from an improved glass composition incorporating cerium dioxide. This glass (CMX) maintains UV cut-off and transmission properties to match the spectral response characteristics of current silicon solar cell types, provides the necessary UV rejection and ionizing particle radiation resistance, and has a high emittance value. Author (ESA)

N83-14727# Departement d'Etudes et de Recherches en Technologie Spatiale, Toulouse (France). Dept Automatique.

ANALYTIC TOOLS FOR THE ELECTRICAL DESIGN OF SOLAR GENERATORS [OUTILS ANALYTIQUES POUR LA CONCEPTION ELECTRIQUE DE GENERATEURS SOLAIRES]

J. P. CHRETIEN, M. ROMERO, and E. DUTRIEU (CNES, Toulouse) /n ESA Photovoltaic Generators in Space p 215-221 Jun. 1982 refs In FRENCH
Avail: NTIS HC A15/MF A01

A probability method which can represent a given population of solar cells, or the generator which can be constructed from them is presented. Generator operation is described by a function linked to the probability that its point of operation coincides with a point on the plane (IV) where I = current, V = voltage. The statistical significance of the function is calculated, and based on this value, the function is evaluated in terms of the initial cell population. Application to a 60 cell population is discussed. Author (ESA)

N83-14728# Optical Coating Lab., Inc., Santa Rosa, Calif. Technical Products Div.

TEXTURED SOLAR CELL COVERS FOR LIGHT WEIGHT AND HIGH PERFORMANCE

R. P. WESTNEY, J. S. BESSEY, and I. M. SACHS /n ESA Photovoltaic Generators in Space p 223-228 Jun. 1982 refs
Avail: NTIS HC A15/MF A01

Testing of frosted, fused silica solar cell covers is described, and the advantages of this technique are outlined. Environments studied were: 1 MeV electrons, to provide a baseline for cell/cover performance; and low energy, 40 KeV protons. Electrical performance, absorptance, emissivity and mechanical strength were studied. Performance is comparable to that of polished configurations, and costs are greatly reduced. The chemical etching process used to produce the textured appearance creates surfaces relatively free from stresses and imperfections, resulting in improved mechanical strength and fewer handling losses. Very thin covers can be produced. Author (ESA)

N83-14729# TRW Space Technology Labs, Redondo Beach, Calif

ULTRALIGHTWEIGHT SOLAR ARRAY TECHNOLOGY

P. GOLDSMITH and R. KURLAND /n ESA Photovoltaic Generators in Space p 231-240 Jun. 1982
Avail: NTIS HC A15/MF A01

Flat fold array technology is described, and performance for a range of missions and power levels is predicted. The array employs large area flat panel flexible substrates. The solar cells are adhesively bonded to a thin Kapton substrate to form individual panel assemblies. Any number of these panel assemblies may be joined together to make a blanket assembly. A container assembly protects each blanket assembly when stowed, and a tension guide wire assembly controls the flexible blanket shape when fully extended. Blanket extension and retraction are achieved through a motor powered lightweight trilateron coilable lattice mast

assembly. Ground and zero gravity flight tests on prototype array assemblies are successful. Author (ESA)

N83-14730# AEG-Telefunken, Wedel (West Germany).

THE DESIGN OF THE L-SAT SOLAR ARRAY

L. GERLACH, G. W. MARKS (Spar Aerospace Ltd., Toronto), E. QUITTNER (Spar Aerospace Ltd., Toronto), J. RENSALL (Spar Aerospace, Ltd., Toronto), and R. SWANENBURG (Royal Netherlands Aircraft Factories Fokker, Amsterdam) /n ESA Photovoltaic Generators in Space p 241-255 Jun. 1982 refs
Avail: NTIS HC A15/MF A01

The concept, requirements, mission phases, design, analyses, and testing of a large, modular, deployable, flexible/foldable blanket, Sun tracking solar array are described. The same design is capable of providing 1.9 kW to 6.5 kW end-of-10 yr geosynchronous equinox power per spacecraft by simple modular changes, with further growth to 7.8 kW by means of structural modifications. The array undergoes partial deployment after insertion into the transfer orbit to develop 3 kW minimum and is fully deployed after apogee engine firing. Author (ESA)

N83-14731# AEG-Telefunken, Wedel (West Germany) Neue Technologien.

SOLAR ARRAYS FOR SMALL SCIENTIFIC SATELLITES

J. KOCH /n ESA Photovoltaic Generators in Space p 257-261 Jun. 1982
Avail: NTIS HC A15/MF A01

The layout and manufacturing sequence of the arrays for the AMPTE 1 and OSCAR 9 satellites are described, and the handmade manufacturing approach is assessed. Handmade arrays need a higher manpower effort, trained qualified personnel, and longer manufacturing time for certain manufacturing steps (especially welding). Advantages include reduced tooling effort, higher flexibility e.g. at design changes, and shorter preparation time between project go ahead and manufacturing start. Application is limited to arrays with 2000 cells maximum. Author (ESA)

N83-14732# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

DETERMINATION OF OPTIMUM SUNLIGHT CONCENTRATION LEVEL IN SPACE FOR 3-5 CASCADE SOLAR CELLS

H. B. CURTIS /n ESA Photovoltaic Generators in Space p 265-270 Jun. 1982 refs
Avail: NTIS HC A15/MF A01

Current-voltage curves were calculated for each cell in a cascade structure using a solar cell diode equation and superposition. Terms for the light generated current, diffusion current, space charge recombination current and series and shunt resistance are included. Individual current voltage curves are added in series with ohmic resistance losses for the cell interconnects to obtain the cascade cell performance. Temperature was varied with concentration, using several models, and ranged from 55 C at one Sun to between 80 and 200 C at 100 Suns. A variety of series resistance and internal resistances were used. Coefficients of the diffusion and recombination terms are strongly temperature dependent. The study indicates that maximum efficiency (30%) occurs in the 50 to 100X Sun concentration range, provided series resistance is below 0.015 ohm-sq cm and cell temperature is 80 C at 100 Suns. Author (ESA)

N83-14733# Societe Nationale Industrielle Aerospatiale, Cannes (France).

ARABSAT SOLAR ARRAY

R. LAGET, C. LONG, and P. GUYOT /n ESA Photovoltaic Generators in Space p 271-275 Jun. 1982 refs
Avail: NTIS HC A15/MF A01

The electrical and mechanical performances of the ARABSAT medium class satellite solar array are described. Primary power (1.3 kW end of 7 yr life) is provided by two separate Sun-oriented solar array wings equipped with back surface reflector. The solar generator is directly derived from graphite epoxy wing technology. It is suitable for telecommunication satellites owing to its very good power/mass ratio (21.4 W/kg), the three axis stabilization

and the partial deployment of the solar array during transfer orbit.
Author (ESA)

N83-14735# British Aerospace Dynamics Group, Bristol (England).

SOLDERED SOLAR ARRAYS

H. C. ALLEN /in ESA Photovoltaic Generators in Space p 287-289 Jun. 1982

Avail: NTIS HC A15/MF A01

The ability of soldered interconnects to withstand a combination of long life and severe environmental conditions was investigated. Improvements in joint life from the use of solder mixes appropriate to low temperature conditions were studied. Solder samples were placed in a 150 C oven for 5 weeks (= 12 yr at 80 C, or 24 at 70 C according to Arrhenius's rule). Conventional and high solder melting point array samples underwent 1000 thermal cycles between -186 and 100 C. Results show that conventional and lead rich soldered arrays can survive 10 yr geostationary orbit missions.
Author (ESA)

N83-14736# British Aerospace Dynamics Group, Bristol (England). Space and Communications Div.

PROGRESS AND DEVELOPMENT STATUS OF THE SPACE TELESCOPE SOLAR ARRAY

R. H. W. FOX /in ESA Photovoltaic Generators in Space p 263-298 Jun. 1982 refs

Avail: NTIS HC A15/MF A01

The development status of the Space Telescope solar array flexible solar cell blanket deployment mechanism, primary deployment mechanism and array orientation subsystems are reviewed. The array has a life time requirement of 5 yr. Design features include the ability to be operated manually in space and replaced as a complete unit in-orbit. Since the Space Telescope itself is too large to test in a conventional, satellite manner, thermal and dynamic analyses were used to prove the design. The deployed array inertia of 700 kg/sqm per wing and the extreme pointing accuracy requirement of the Space Telescope require an extremely sophisticated array orientation subsystem.
Author (ESA)

N83-14737# British Aerospace Dynamics Group, Bristol (England). Space and Communications Div.

FUTURE DEVELOPMENTS AND APPLICATIONS FOR THE SPACE TELESCOPE SOLAR ARRAY

R. H. W. FOX /in ESA Photovoltaic Generators in Space p 299-303 Jun 1982

Avail: NTIS HC A15/MF A01

The adaptation of the Space Telescope solar array to experimental platforms or space shuttle limited duration missions is considered. Using the present design technology, a power growth up to 10 kW is envisaged. Geostationary orbit power versus mass for variants up to 8kW (10 year equinox) are shown. Power can be increased by adding solar panel assemblies (SPA) to the blankets. The present 8 in drum diameter and flexible power transfer harness enables a further SPA to be added by extending the Bi-Stem booms an additional 1.2 m, giving 6 kW beginning of life (BOL). By deletion when not required of shadow diodes (+4%) and the use of higher efficiency cells (+5%) a further power growth to 6.7kW BOL is possible with negligible impact on the present design, and qualification status. For increases of SPA above 6 per half wing, 24 total, the Bi-Stem size must be increased. Alternatively, Bi-Stem type and drum diameter increase may be possible. Both modifications are straightforward but require partial requalification.
Author (ESA)

N83-14738# British Aerospace Dynamics Group, Bristol (England).

ANTI-STATIC COAT FOR SOLAR ARRAYS

C. N. FELLAS /in ESA Photovoltaic Generators in Space p 305-307 Jun. 1982 refs

Avail: NTIS HC A15/MF A01

A Kapton based composite material, suitable as a substrate for flexible solar arrays, was designed, constructed and tested under electron energies ranging from 5 to 30 keV. The rear of

the array under adverse eclipse conditions (-197 C) produced voltages well below the discharge threshold. An antistatic coat suitable as a front cover for solar arrays is also described. The thermal and optical transmission characteristics were tested and are satisfactory, but the UV and particle degradation of the Tedlar material needs to be evaluated.
Author (ESA)

N83-14741# Massachusetts Inst. of Tech., Cambridge. Dept. of Chemistry.

FUEL AND ELECTRICITY GENERATION FROM ILLUMINATION OF INORGANIC INTERFACES Interim Technical Report

M. S. WRIGHTON 27 Aug 1982 39 p refs Submitted for publication Sponsored in part by DOE, GTE Labs. and Dow Chemical Co.

(Contract N00014-75-C-0880; NR PROJ. 051-579)

(AD-A119305, TR-34) Avail: NTIS HC A03/MF A01 CSCL 07B

Semiconductor-based photoelectrochemical devices represent good systems for the sustained, direct conversion of light to chemical or electrical energy. The interfacial structure, energetics, and redox kinetics control the overall performance of such systems. Examples of improvements in efficiency and durability of photoelectrochemical cells stemming from chemical manipulations at semiconductor/liquid electrolyte interfaces illustrate the critical importance of understanding interface properties
Author (GRA)

N83-14751# California Univ., Berkeley. Lawrence Berkeley Lab. Energy and Environment Div.

SMALL-SCALE ENERGY-TECHNOLOGY PROJECTS IN THE PACIFIC TERRITORIES: A CASE-STUDY REVIEW

C. W. CASE and M. K. ACTOUKA (Hawaii Univ.) Sep. 1981 47 p refs Presented at the Conf. on Ocean Resource Develop. in the Pacific, Honolulu, Hawaii, 13-15 Oct 1981

(Contract W-7405-ENG-48)

(DE82-001338; LBL-12818, CONF-811053-1) Avail: NTIS HC A03/MF A01

A small-scale energy projects funded in the Pacific Territories attempts to be appropriate for developing Pacific island communities by using local labor and materials, using renewable resources, incorporating simple technologies, and being culturally sensitive. During the last three years the projects were monitored. Five case studies were prepared which illustrate elements and define features which contribute or hinder technology transfer. Case studies include a typhoon-proof greenhouse on Guam, wood stoves and small solar devices on Yap, various devices built at a youth educational facility on Ponape, an unusual solar hot water system on Majuro, and a solar fish drying facility on an outer Truk island.
DOE

N83-14761# Sandia Labs., Albuquerque, N. Mex.

DEVELOPMENT EFFORT OF SHEET MOLDING COMPOUND (SMC) PARABOLIC TROUGH PANELS

P. A. KIRSCH (Budd Co., Fort Washington, Pa.) and R. L. CHAMPION 1982 17 p refs Presented at the 37th Ann. Tech. Conf. on Reinforced Plastics/Composites, Washington, D.C., 11 Jan. 1982

(Contract DE-AC04-76DP-00789)

(DE82-000841, CONF-820103-1) Avail: NTIS HC A02/MF A01

The approach taken to meet the objectives was to design the parabolic panel, fabricate a prototype die, choose an SMC formulation and mold the glass and SMC together into a vertex to rim mirrored panel. The main thrust of the program was to successfully co-mold a mirrored glass sheet with the SMC. Results indicate that mirrored glass sheets, if properly strengthened to withstand the temperature and pressure of the molding process, can be successfully molded with SMC in a single press stroke using standard compression molding techniques. The finalized design of the trough panel is given. The SMC formulation chosen is a low shrink, low profile SMC using 40% by weight one inch chopped glass fibers in a uv stabilized polyester resin matrix. A program to test for the adhesion between mirrored glass sheets and the SMC is discussed briefly.
DOE

02 SOLAR ENERGY

N83-14762# Lincoln Housing Authority, Nebr. **RESIDENTIAL PHOTOVOLTAIC EXPERIMENT STATION DATA SYSTEM**

H. A. FENTON and C. H. MUCH 1981 7 p Presented at IECI '81, San Francisco, 9-12 Nov. 1981
(Contract DE-AC02-76ET-20279)
(DE82-001646; DOE/ET-20279-155, CONF-811110-2) Avail:
NTIS HC A02/MF A01

A microprocessor-based system acquires data from and controls residential photovoltaic power system evaluation experiments. Each station monitors 30 or more experiment sites. Unique features are the use of data from one site to control another and the easy addition, removal, or modification of sensors or sites without disruption of the system. DOE

N83-14763# AEG-Telefunken, Wedel (West Germany). Fachbereich Neue Technologien, Raumfahrt. **SYSTEM ANALYSIS, DESIGN, CONSTRUCTION AND COMMISSIONING OF A PHOTOVOLTAIC POWER PLANT FOR SUPPLY OF BROADCASTING EQUIPMENT** Final Report, Apr. 1981

D. KEAVENY Bonn Bundesministerium fuer Forschung und Technologie Aug. 1982 124 p refs In GERMAN, ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-125; ISSN-0340-7608) Avail. NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 23,50

A photovoltaic power plant to supply a broadcasting transmitter was designed, built and tested in order to validate the application of photovoltaic power plants for the self sufficient power supply of broadcasting equipment. Berlin was chosen for data collection and field testing. A 600 W transmitter was installed as load. After construction and commissioning, the plant, (solar generator, energy conditioning and control, storage battery, and transmitter) was tested for 1 yr. The field testing demonstrates that in Central European latitudes photovoltaic power plants can guarantee a self supporting operation of broadcasting equipment. Author (ESA)

N83-14764# Schott Glaswerke, Mainz (West Germany) **FLAT PLATE SOLAR COLLECTORS** Final Report, Jul. 1980

E. HUSSMANN Bonn Bundesministerium fuer Forschung und Technologie Aug. 1982 100 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-139; ISSN-0340-7608) Avail. NTIS HC A05/MF A01, Fachinformationszentrum, Karlsruhe, West Germany DM 21

Flat plate collectors of conventional design with high efficiency were developed. A special metal sheet fastened to the absorber led to a construction which is gas tight and tolerates no flow conditions. Such collectors have a long service life. The influence of the cover system on efficiency was investigated by computer simulation. The type of panel, the number and selective coatings on the panel or on the absorber were varied. Loads from the environment and operating loads e.g., pressure rise related to temperature rise and thermal stresses were analyzed, especially for cover systems and the bonding of the panels, to the absorber. Prototypes were built and tested. Author (ESA)

N83-14808# Cologne Univ. (West Germany). **DETERMINATION OF THE RADIATION BUDGET AT THE EARTH'S SURFACE FROM SATELLITE DATA**

W. MOESER In: *Satellite Meas. of the Earth Radiation Budget* p 156-170 Jul. 1982 refs
Avail: NTIS HC A08/MF A01

The determination of the global Earth surface radiation budget and of the surface albedo is presented. The problem of determining the solar part of the radiation balance equation, especially the global radiation, was solved in various studies because of its interdisciplinary relevance not only for meteorology, but also for agriculture and solar energy purposes. The results show that the errors can be kept on the order of about 10% to 15% for hourly values, but high accuracy is obtained for longer time intervals

The problem of a proper comparison method between the two different measuring geometries (surface measurement - satellite measurement) remains. Surface albedos are to be derived from satellite images except for mountainous and inhomogeneous landscapes because of the various effects of shadowing which can hardly be simulated by radiative transfer theory.

Author (ESA)

N83-15807*# National Aeronautics and Space Administration, Washington, D C **NASA-OAST PROGRAM IN PHOTOVOLTAIC ENERGY CONVERSION**

J. P. MULLIN and D. J. FLOOD In NASA. Lewis Research Center Space Photovoltaic Res. and Technol. 1982: High Efficiency, Radiation Damage, and Blanket Technol. p 1-4 1982
Avail: NTIS HC A12/MF A01 CSCL 10A

The NASA program in photovoltaic energy conversion includes research and technology development efforts on solar cells, blankets, and arrays. The overall objectives are to increase conversion efficiency, reduce mass, reduce cost, and increase operating life. The potential growth of space power requirements in the future presents a major challenge to the current state of technology in space photovoltaic systems. Author

N83-15808*# Pennsylvania Univ., Philadelphia. **NEW SILICON CELL DESIGN CONCEPTS FOR 20 PERCENT AMI EFFICIENCY**

M. WOLF In NASA. Lewis Research Center Space Photovoltaic Res. and Technol. 1982: High Efficiency, Radiation Damage, and Blanket Technol. p 5-12 1982 refs
Avail: NTIS HC A12/MF A01 CSCL 10A

The basic design principles for obtaining high efficiency in silicon solar cells are reviewed. They critically involve very long minority carrier lifetimes, not so much to attain high collection efficiency, but primarily for increased output voltages. Minority carrier lifetime, however, is sensitive to radiation damage, and particularly in low resistivity silicon, on which the high efficiency design is based. Radiation resistant space cells will therefore have to follow differing design principles than high efficiency terrestrial cells. Author

N83-15809*# Applied Solar Energy Corp., City of Industry, Calif. **RECENT DEVELOPMENTS IN THIN SILICON SOLAR CELLS**

F. HO and P. ILES In NASA. Lewis Research Center Space Photovoltaic Res. and Technol. 1982: High Efficiency, Radiation Damage, and Blanket Technol. p 17-24 1982
Avail: NTIS HC A12/MF A01 CSCL 10A

Fifty micron thick cells 2x4 sq cm area with coplanar back contacts were made with good yield, and with output equivalent to conventional top/bottom contact cells of the same thickness. A wraparound junction (WAJ) design was selected, and used successfully. The low alpha cells delivered were all above 12%, the average efficiency was 13% and the best was 14%. The overall yield was 35 to 40%, comparable to that for conventional 50 micron cells. The process sequence was moderately complex, but showed good reproducibility. The CBC cells performed well under several important environmental tests. High alpha CBC cells were made, with about 1% increase in conversion efficiency. The most important design criteria were the choice of back surface N+ and P+ areas. Author

N83-15810*# Spire Corp., Bedford, Mass. **LARGE AREA SPACE SOLAR CELL ASSEMBLIES**

M. B. SPITZER and M. J. NOWLAN In NASA. Lewis Research Center Space Photovoltaic Res. and Technol. 1982: High Efficiency, Radiation Damage, and Blanket Technol. p 25-36 1982 refs
Avail: NTIS HC A12/MF A01 CSCL 10A

Development of a large area space solar cell assembly is presented. The assembly consists of an ion implanted silicon cell and glass cover. The important attributes of fabrication are (1) use of a back surface field which is compatible with a back surface reflector, and (2) integration of coverglass application and cell fabrication. Author

N83-15811*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

SIMULATED SPACE FLIGHT TESTING OF COMMERCIAL TERRESTRIAL SILICON CELLS

P. M. STELLA and T. F. MIYAHIRA *In* NASA. Lewis Research Center Space Photovoltaic Res. and Technol. 1982: High Efficiency, Radiation Damage, and Blanket Technol. p 37-43 1982 refs

Avail: NTIS HC A12/MF A01 CSCL 10A

Low cost silicon solar cells manufactured for the terrestrial market are examined for possible space flight use. The results of preliminary space environmental testing are reported and discussed. In addition, a number of possible obstacles to the use of these cells is examined. It is concluded that the terrestrial industry could provide an extremely low cost and reliable cell for space use. Author

N83-15812*# Nebraska Univ., Lincoln. Dept. of Electrical Engineering.

DIFFUSION LENGTH MEASUREMENTS IN SOLAR CELLS: AN ANALYSIS AND COMPARISON OF TECHNIQUES

J. A. WOOLLAM (Universal Energy Systems), A. A. KHAN, R. J. SOUKUP, and A. M. HERMANN (Midwest Research Inst.) *In* NASA. Lewis Research Center Space Photovoltaic Res. and Technol. 1982: High Efficiency, Radiation Damage, and Blanket Technol. p 45-56 1982 refs

(Contract NAG3-120)

Avail: NTIS HC A12/MF A01 CSCL 10A

A brief review of the major techniques for measuring minority carrier diffusion lengths in solar cells is given. Emphasis is placed on comparing limits of applicability for each method, especially as applied to silicon cells or to gallium arsenide cells, including the effects of radiation damage. Author

N83-15813*# Vanan Associates, Palo Alto, Calif.

PROGRESS TOWARD CASCADE CELLS MADE BY OM-VPE

P. G. BORDEN, R. A. LARUE, and M. J. LUDOWISE *In* NASA. Lewis Research Center Space Photovoltaic Res. and Technol. 1982: High Efficiency, Radiation Damage, and Blanket Technol. p 57-65 1982 refs Sponsored in part by DOE

(Contract NAS3-22232)

Avail: NTIS HC A12/MF A01 CSCL 10A

Organometallic Vapor Phase Epitaxy (OM-VPE) was used to make a sophisticated monolithic cascade cell, with a peak AMO efficiency of 16.6%, not corrected for 14% grid coverage. The cell has 9 epitaxial layers. The top cell is 1.35 microns thick with a 0.1 micron thick emitter. Both cells are heteroface n-p structures. The cascade cell uses metal interconnects. Details of growth and processing are described. Author

N83-15814*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

DETERMINATION OF OPTIMUM SUNLIGHT CONCENTRATION LEVEL IN SPACE FOR 3-5 CASCADE SOLAR CELLS

H. B. CURTIS *In* its Space Photovoltaic Res. and Technol. 1982: High Efficiency, Radiation Damage, and Blanket Technol. p 69-78 1982 refs Previously announced as 82N-32853

Avail: NTIS HC A12/MF A01 CSCL 10A

The optimum range of concentration levels in space for III-V cascade cells was calculated using a realistic solar cell diode equation. Temperature was varied with concentration using several models and ranged from 55 C at 1 sun to between 80 and 200 C at 100 suns. A variety of series resistance and internal resistances were used. Coefficients of the diffusion and recombination terms are strongly temperature dependent. The study indicates that the maximum efficiency of 30 percent occurs in the 50 to 100 sun concentration range provided series resistance is below 0.015 ohm-sq cm and cell temperature is about 80 C at 100 suns. Author

N83-15815*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

SOLAR ENERGY CONVERSION USING SURFACE PLASMONS FOR BROADBAND ENERGY TRANSPORT

L. M. ANDERSON *In* its Space Photovoltaic Res. and Technol. 1982: High Efficiency, Radiation Damage, and Blanket Technol. p 79-87 1982 refs

Avail: NTIS HC A12/MF A01 CSCL 10A

A new strategy for efficient solar energy conversion based on parallel processing with surface plasmons is introduced. The approach is unique in identifying: (1) a broadband carrier with suitable range for energy transport, and (2) a technique to extract more energy from the more energetic photons, without sequential losses or unique materials for each frequency band. The aim is to overcome the fundamental losses associated with the broad solar spectrum and to achieve a higher level of spectrum splitting than has been possible in semiconductor systems. Author

N83-15816*# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.

AIR FORCE DEVELOPMENT OF THIN GAAS SOLAR CELLS

K. MASLOSKI *In* NASA. Lewis Research Center Space Photovoltaic Res. and Technol. 1982: High Efficiency, Radiation Damage, and Blanket Technol. p 93-97 1982 refs

Avail: NTIS HC A12/MF A01 CSCL 10A

The advantages of gallium arsenide (GaAs) over silicon (Si) type solar cells are well documented. However, two major disadvantages are weight and cost. Several ideas have recently surfaced that, if successful, will diminish these disadvantages. The CLEFT peeled film technique and the galicon cell are two of the more promising approaches. Low weight, low cost, high efficiency GaAs solar cell research is summarized. Author

N83-15817*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

PROGRESS TOWARD THIN-FILM GAAS SOLAR CELLS USING A SINGLE-CRYSTAL SI SUBSTRATE WITH A GE INTERLAYER

Y. C. M. YEH, K. L. WANG, and S. ZWERDLING *In* NASA. Lewis Research Center Space Photovoltaic Res. and Technol. 1982: High Efficiency, Radiation Damage, and Blanket Technol. p 99-104 1982

(Contract NAS7-100)

Avail: NTIS HC A12/MF A01 CSCL 10A

Development of a technology for fabricating light-weight, high-efficiency, radiation-resistant solar cells for space applications is reported. The approaches currently adopted are to fabricate shallow homojunction n(+)/p as well as p/n AlGaAs-heteroface GaAs solar cells by organometallic chemical vapor deposition (OM-CVD) on single-crystal Si substrates using in each case, a thin Ge epi-interlayer first grown by CVD. This approach maintains the advantages of the low specific gravity of Si as well as the high efficiency and radiation-resistant properties of the GaAs solar cell which can lead to greatly improved specific power for a solar array. The growth of single-crystal GaAs epilayers on Ge epi-interlayers on Si substrates is investigated. Related solar cell fabrication is reviewed. Author

N83-15818*# Rensselaer Polytechnic Inst., Troy, N. Y.

DIFFUSED P+-N SOLAR CELLS IN BULK GAAS

J. M. BORREGO and S. K. GHANDHI *In* NASA. Lewis Research Center Space Photovoltaic Res. and Technol. 1982: High Efficiency, Radiation Damage, and Blanket Technol. p 105-108 1982 refs

(Contract NAG3-188)

Avail: NTIS HC A12/MF A01 CSCL 10A

Recently melt grown GaAs, made by liquid encapsulation techniques, has become available. This material is of sufficiently good quality to allow the fabrication of solar cells by direct diffusion. Results obtained with p(+)/n junction solar cells made by zinc diffusion are described. The quality of bulk GaAs for this application is evaluated. Author

02 SOLAR ENERGY

N83-15819*# Rockwell International Corp., Thousand Oaks, Calif. Microelectronics Research and Development Center.
ADVANCES IN LARGE-DIAMETER LIQUID ENCAPSULATED CZOCHRALSKI GAAS

R. T. CHEN, D. E. HOLMES, and C. G. KIRKPATRICK /in NASA. Lewis Research Center Space Photovoltaic Res. and Technol. 1982: High Efficiency, Radiation Damage, and Blanket Technol. p 109-122 1982 refs

(Contract NAS3-22224; NAS3-22235)

Avail: NTIS HC A12/MF A01 CSCL 10A

The purity, crystalline perfection, and electrical properties of n- and p-type GaAs crystals grown by the liquid encapsulated Czochralski (LEC) technique are evaluated. The determination of the dislocation density, incidence of twinning, microstructure, background purity, mobility, and minority carrier diffusion length is included. The properties of the LEC GaAs crystals are generally comparable to, if not superior to those of small-diameter GaAs material grown by conventional bulk growth techniques. As a result, LEC GaAs is suitable for application to minority carrier devices requiring high-quality and large-area substrates. Author

N83-15820*# Hughes Research Labs., Malibu, Calif.
GAAS SOLAR CELLS FOR CONCENTRATOR SYSTEMS IN SPACE

R. Y. LOO, R. C. KNECHTLI, and G. S. KAMATH /in NASA. Lewis Research Center Space Photovoltaic Res. and Technol. 1982: High Efficiency, Radiation Damage, and Blanket Technol. p 123-130 1983 refs

(Contract NAS3-22227)

Avail: NTIS HC A12/MF A01 CSCL 10A

Cells for operation in space up to more than 100 suns were made, and an AMO efficiency of 21% at 100 suns with these cells was obtained. The increased efficiency resulted not only from the higher open circuit voltage associated with the higher light intensity (higher short circuit current); it also benefitted from the increase in fill factor caused by the lower relative contribution of the generation recombination current to the forward bias current when the cell's operating current density is increased. The experimental cells exhibited an AMO efficiency close to 16% at 200 C. The prospect of exploiting this capability for the continuous annealing of radiation damage or for high temperature missions (e.g., near Sun missions) remains therefore open. Space systems with concentration ratios on the order of 100 suns are presently under development. The tradeoff between increased concentration ratio and increased loss due to the cell's series resistance remains attractive even for space applications at a solar concentrator ratio of 100 suns. In the design of contact configuration with low enough series resistance for such solar concentration ratios, the shallow junction depth needed for good radiation hardness and the thin AlGaAs layer thickness needed to avoid excessive optical absorption losses have to be retained. Author

N83-15821*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

THE EFFECT OF DIFFERENT SOLAR SIMULATORS ON THE MEASUREMENT OF SHORT-CIRCUIT CURRENT TEMPERATURE COEFFICIENTS

H. B. CURTIS and R. E. HART, JR. /in its Space Photovoltaic Res. and Technol. 1982: High Efficiency, Radiation Damage, and Blanket Technol. p 131-136 1982 refs

Avail: NTIS HC A12/MF A01 CSCL 10A

Gallium arsenide solar cells are considered for several high temperature missions in space. Both near-Sun and concentrator missions could involve cell temperatures on the order of 200 C. Performance measurements of cells at elevated temperatures are usually made using simulated sunlight and a matched reference cell. Due to the change in bandgap with increasing temperature at portions of the spectrum where considerable simulated irradiance is present, there are significant differences in measured short circuit current at elevated temperatures among different simulators. To illustrate this, both experimental and theoretical data are presented for gallium arsenide cells. Author

N83-15822*# Florida Univ., Gainesville.

DEFECTS AND ANNEALING STUDIES IN 1-ME ELECTRON IRRADIATED (ALGA)AS-GAAS SOLAR CELLS

S. S. LI, W. L. WANG, R. Y. LOO (Hughes Research Labs.), and W. P. RAHILLY (AFWAL) /in NASA. Lewis Research Center Space Photovoltaic Res. and Technol. 1982: High Efficiency, Radiation Damage, and Blanket Technol. p 137-144 1982 refs Sponsored in part by AFWAL

Avail: NTIS HC A12/MF A01 CSCL 10A

The deep-level defects and recombination mechanisms in the one-MeV electron irradiated (AlGa)As-GaAs solar cells under various irradiation and annealing conditions are discussed. Deep-level transient spectroscopy (DLTS) and capacitance-voltage (CV) techniques were used to determine the defect and recombination parameters such as energy levels and defect density, carrier capture cross sections and lifetimes for both electron and hole traps as well as hole diffusion lengths in these electron irradiated GaAs solar cells. GaAs solar cells used in this study were prepared by the infinite solution melt liquid phase epitaxial (LPE) technique at Hughes Research Lab., with (Al_{0.9}Ga_{0.1})As window layer, Be-diffused p-GaAs layer on Sn-doped n-GaAs or undoped n-GaAs active layer grown on n(+)-GaAs substrate. Mesa structure with area of 5.86x1000 sq cm was fabricated. Three different irradiation and annealing experiments were performed on these solar cells. Author

N83-15823*# Rome Air Development Center, Hanscom AFB, Mass.

DEFECT BEHAVIOR IN ELECTRON-IRRADIATED BORON- AND GALLIUM-DOPED SILICON

P. J. DREVINSKY and H. M. DEANGELIS /in NASA. Lewis Research Center Space Photovoltaic Res. and Technol. 1982: High Efficiency, Radiation Damage, and Blanket Technol. p 145-155 1982 refs

Avail: NTIS HC A12/MF A01 CSCL 10A

Production and anneal of defects in electron-irradiated, float-zone silicon solar cells were studied by DLTS. In boron- and gallium-doped, n+-p cells, dominant defects were due to the divacancy, carbon interstitial, and carbon complex. Results suggest that the DLTS peak normally ascribed to carbon complexes also involves gallium. For gallium- and, to a lesser extent, boron-doped samples, damaged lifetime shows substantial recovery only when the carbon-complex peak has annealed out at 400 C. In boron-doped, n+-p-p+ cells, a minority carrier trap (E1) was also observed by DLTS in cells with a boron p+, but not in those with an aluminum p+ back. A level at Ev + 0.31 eV appeared upon 150 C annealing (E1 out) in both p+ back types of samples. Author

N83-15824*# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.

COLD CRUCIBLE CZOCHRALSKI FOR SOLAR CELLS

T. M. TRUMBLE /in NASA. Lewis Research Center Space Photovoltaic Res. and Technol. 1982: High Efficiency, Radiation Damage, and Blanket Technol. p 157-161 1982 refs

Avail: NTIS HC A12/MF A01 CSCL 10A

The efficiency and radiation resistance of present silicon solar cells are a function of the oxygen and carbon impurities and the boron doping used to provide the proper resistivity material. The standard Czochralski process used to grow single crystal silicon contaminates the silicon stock material due to the use of a quartz crucible and graphite components. The use of a process which replaces these elements with a water cooled copper to crucible has provided a major step in providing gallium doped (100) crystal orientation, low oxygen, low carbon, silicon. A discussion of the Cold Crucible Czochralski process and recent float zone developments is provided. L.F.M.

N83-15825*# Lincoln Lab., Mass. Inst. of Tech., Lexington.
MICRODISTRIBUTION OF OXYGEN IN SILICON AND ITS EFFECTS ON ELECTRONIC PROPERTIES

H. C. GATOS, B. Y. MAO, K. NAUKA, and J. LAGOWSKI /in NASA. Lewis Research Center Space Photovoltaic Res. and Technol. 1982: High Efficiency, Radiation Damage, and Blanket Technol. p 163-169 1982 refs (Contract NSG-3017)

Avail: NTIS HC A12/MF A01 CSCL 10A

The effects of interstitial oxygen on the electrical characteristics of Czochralski-grown silicon crystals were investigated for the first time on a microscale. It was found that the generation of thermal donors is not a direct function of the oxygen concentration. It was further found that the minority carrier life-time decreases with increasing oxygen concentration, on a microscale in as-grown crystals. It was thus shown, again for the first time, that oxygen in as grown crystals is not electronically inert as generally believed. Preannealing at 1200 C commonly employed in device fabrication, was found to suppress the donor generation at 450 C and to decrease the deep level concentrations. Author

N83-15826*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

RADIATION DAMAGE AND ANNEALING IN LARGE AREA N+/P/P+ GaAs SHALLOW HOMOJUNCTION SOLAR CELLS

D. J. FLOOD, D. J. BRINKER, C. K. SWARTZ, R. E. HART, JR., and J. C. C. FAN (MIT, Lincoln Lab., Lexington) /in its Space Photovoltaic Res. and Technol. 1982: High Efficiency, Radiation Damage, and Blanket Technol. p 179-184 1982 refs

Avail: NTIS HC A12/MF A01 CSCL 10A

Annealing of radiation damage was observed for the first time in VPE-grown, 2- by 2-cm, n+/p/p+ GaAs shallow homojunction solar cells. Electrical performance of several cells was determined as a function of 1-MeV electron fluence in the range of 10 to the 13th power to 10 to the 15th power e-/sq cm and as a function of thermal annealing time at various temperatures. Degradation of normalized power output after a fluence of 10 to the 15th power 1-MeV electrons/sq cm ranged from a low of 24 to 31 percent of initial maximum power. Normalized short circuit current degradation was limited to the range from 10 to 19 percent of preirradiated values. Thermal annealing was carried out in a flowing nitrogen gas ambient, with annealing temperatures spanning the range from 125 to 200 C. Substantial recovery of short circuit current was observed at temperatures as low as 175 C. In one case improvement by as much as 10 percent of the postirradiated value was observed. The key features of these cells are their extremely thin emitter layers (approximately 0.05 micrometers), the absence of any Al sub xGd sub 1-x As passivating window layer, and their fabrication by vapor phase epitaxy. Author

N83-15827*# Communications Satellite Corp., Clarksburg, Md.
BASIS FOR EQUIVALENT FLUENCE CONCEPT IN SPACE SOLAR CELLS

A. MEULENBERG /in NASA. Lewis Research Center Space Photovoltaic Res. and Technol. 1982: High Efficiency, Radiation Damage, and Blanket Technol. p 185-194 1982 refs

Avail: NTIS HC A12/MF A01 CSCL 10A

The equivalent fluence concept is defined, and its use and potential problems are noted. Silicon and GaAs solar cells are compared in a radiation environment. The analysis indicates that valid equivalent fluence values may be easier to obtain in GaAs than in silicon. Author

N83-15828*# Florida Univ., Gainesville.

GROWN-IN DEFECTS AND DEFECTS PRODUCED BY 1-ME ELECTRON IRRADIATED IN AL_{0.3}GA_{0.7}AS P-N JUNCTION SOLAR CELLS

S. S. LI, K. W. TENG, D. W. SCHOENFELD, and W. P. RAHILLY (AFWAL) /in NASA. Lewis Research Center Space Photovoltaic Res. and Technol. 1982: High Efficiency, Radiation Damage, and Blanket Technol. p 195-200 1982 refs Sponsored in part by AFWAL

Avail: NTIS HC A12/MF A01 CSCL 10A

Studies of grown-in defects and defects produced by the one-MeV electron irradiation in Al sub 0.3 Ga sub 0.7As p-n junction solar cells fabricated by liquid phase epitaxial (LPE) technique were made for the unirradiated and one-MeV electron irradiated samples, using DLTS and C-V methods. Defect and recombination parameters such as energy level, defect density, carrier capture cross sections and lifetimes were determined for various growth, annealing, and irradiation conditions. L.F.M.

N83-15829*# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.

PROGRESS IN DEVELOPING HIGH PERFORMANCE SOLAR BLANKETS AND ARRAYS

J. SCOTT-MONCK /in NASA. Lewis Research Center Space Photovoltaic Res. and Technol. 1982: High Efficiency, Radiation Damage, and Blanket Technol. p 201-209 1982 refs

Avail: NTIS HC A12/MF A01 CSCL 10A

The development of high efficiency, ultrathin silicon solar cells offers both opportunity and challenge. It is possible to consider 400 W/kg blanket designs by using this cell in conjunction with flexible substrates, ultrathin covers and welded interconnects. By designing array structure which is mechanically and dynamically compatible with very low mass blankets, solar arrays with a specific power approaching 200 W/kg are achievable. Further improvements in blanket performance (higher power and lower mass per unit area), which could come from the implementation of higher efficiency cells operating at lower temperatures (silicon or GaAs), and the use of encapsulants, would result in the development of 300 W/kg solar arrays. L.F.M.

N83-15830*# TRW Defense and Space Systems Group, Redondo Beach, Calif.

MINIATURIZED CASSEGRAINIAN CONCENTRATOR CONCEPT DEMONSTRATION

R. E. PATTERSON and H. S. RAUSCHENBACH /in NASA. Lewis Research Center Space Photovoltaic Res. and Technol. 1982: High Efficiency, Radiation Damage, and Blanket Technol. p 211-221 1982 refs

(Contract NAS8-34131)

Avail: NTIS HC A12/MF A01 CSCL 10A

High concentration ratio photovoltaic systems for space applications have generally been considered impractical because of perceived difficulties in controlling solar cell temperatures to reasonably low values. A miniaturized concentrator system is now under development which surmounts this objection by providing acceptable solar cell temperatures using purely passive cell cooling methods. An array of identical miniaturized, rigid Cassegrainian optical systems having a low f-number with resulting short dimensions along their optical axes are rigidly mounted into a frame to form a relatively thin concentrator solar array panel. A number of such panels, approximately 1.5 centimeters thick, are wired as an array and are folded against one another for launch in a stowed configuration. Deployment on orbit is similar to the deployment of conventional planar honeycomb panel arrays or flexible blanket arrays. The miniaturized concept was conceived and studied in the 1978-80 time frame. Progress in the feasibility demonstration to date is reported. L.F.M.

02 SOLAR ENERGY

N83-15831*# Jet Propulsion Lab., California Inst of Tech., Pasadena.

THE COURSE OF SOLAR ARRAY WELDING TECHNOLOGY DEVELOPMENT

P. M. STELLA *In* NASA. Lewis Research Center Space Photovoltaic Res. and Technol. 1982: High Efficiency, Radiation Damage, and Blanket Technol. p 223-230 1982 refs
Avail: NTIS HC A12/MF A01 CSCL 10A

Solar array welding technology is examined from its beginnings in the late 1960's to the present. The U.S. and European efforts are compared, and significant similarities are highlighted. The utilization of welding technology for space use is shown to have been influenced by a number of subtle, secondary factors.

Author

N83-15832*# Jet Propulsion Lab., California Inst of Tech., Pasadena.

A PRELIMINARY EVALUATION OF A POTENTIAL SPACE WORTH ENCAPSULANT

J. SCOTT-MONCK *In* NASA. Lewis Research Center Space Photovoltaic Res. and Technol. 1982: High Efficiency, Radiation Damage, and Blanket Technol. p 231-236 1982 refs
Avail: NTIS HC A12/MF A01 CSCL 10A

A new polymer polyimide possessing optical and mechanical properties potentially suitable for space applications now exists. A preliminary evaluation of the material indicates that in its present state of development, the polyimide is not ready for space qualification. Further efforts to increase molecular weight and purify the constituents used to synthesize it are warranted. Activities addressing these needs are now being pursued. If these approaches prove successful, additional testing will take place with an emphasis on synergistic effects.

L.F.M.

N83-15833*# National Aeronautics and Space Administration Lewis Research Center, Cleveland, Ohio.

MICROSTRUCTURAL ANALYSIS OF SOLAR CELL WELDS

T. J. MOORE, G. K. WATSON, and C. R. BARAONA *In* its Space Photovoltaic Res. and Technol. 1982: High Efficiency, Radiation Damage, and Blanket Technol. p 237-249 1982 refs
Avail: NTIS HC A12/MF A01 CSCL 10A

Parallel-gap resistance welding of silicon solar cells with copper interconnects results in complex microstructural variations that depend on the welding variables. At relatively low heat input solid-state welds are produced. At medium heat the Ag-Cu eutectic forms resulting in a braze joint. High heat produces a fusion weld with complete melting of the silver layer on the silicon solar cell. If the silicon is also melted, cracking occurs in the silicon cell below the weld nugget. These determinations were made using light microscopy, microprobe, and scanning electron microscopy analyses.

Author

N83-15834*# National Aeronautics and Space Administration Lewis Research Center, Cleveland, Ohio.

EVALUATION OF SOLAR CELL WELDS BY SCANNING ACOUSTIC MICROSCOPY

S. J. KLIMA, W. E. FREY, and C. R. BARAONA *In* its Space Photovoltaic Res. and Technol. 1982: High Efficiency, Radiation Damage, and Blanket Technol. p 251-258 1982 refs
Avail: NTIS HC A12/MF A01 CSCL 10A

Scanning laser acoustic microscopy was used to nondestructively evaluate solar cell interconnect bonds made by resistance welding. Both copper-silver and silver-silver welds were analyzed. The bonds were produced either by a conventional parallel-gap welding technique using rectangular electrodes or new annular gap design with a circular electrode cross section. With the scanning laser acoustic microscope, it was possible to produce a real time television image which reveals the weld configuration as it relates to electrode geometry. The effect of electrode misalignment with the surface of the cell was also determined. A preliminary metallographic analysis was performed on selected welds to establish the relationship between actual size and shape

of the weld area and the information available from acoustic micrographs.

Author

N83-15835*# Communications Satellite Corp., Clarksburg, Md
SILICON RESEARCH AND TECHNOLOGY

A. MEULENBERG *In* NASA. Lewis Research Center Space Photovoltaic Res. and Technol. 1982: High Efficiency, Radiation Damage, and Blanket Technol. p 259-263 1982
Avail: NTIS HC A12/MF A01 CSCL 10A

The development of solar cells suitable for space applications are discussed, along with the advantages and disadvantages of silicon and gallium arsenide solar cells. The goal of a silicon solar cell with 18% efficiency has not been reached and does not appear promising in the near future.

L.F.M.

N83-15836*# National Aeronautics and Space Administration Langley Research Center, Hampton, Va.

GAAS SOLAR CELLS

E. J. CONWAY *In* NASA. Lewis Research Center Space Photovoltaic Res. and Technol. 1982: High Efficiency, Radiation Damage, and Blanket Technol. p 265-266 1982
Avail: NTIS HC A12/MF A01 CSCL 10A

The major thrusts proposed for GaAs were increased efficiency and improved radiation damage data. Current laboratory production cells consistently achieve 16 percent AMO one-Sun efficiency. The user community wants 18-percent efficient cells as soon as possible, and such a goal is though to be achievable in 2 years with sufficient research funds. A 20-percent research cell is considered the efficiency limit with current technology, and such a cell seems realizable in approximately 4 years. Future efficiency improvements await improved substrates and materials. For still higher efficiencies, concentrator cells and multijunction cells are proposed as near-term directions.

L.F.M.

N83-15837*# National Aeronautics and Space Administration Lewis Research Center, Cleveland, Ohio.

RADIATION DAMAGE

I. WEINBERG *In* its Space Photovoltaic Res. and Technol. 1982: High Efficiency, Radiation Damage, and Blanket Technol. p 267-268 1982
Avail: NTIS HC A12/MF A01 CSCL 10A

The radiation damage workshop considered a variety of topics among which were the need for equivalent electron fluences in gallium arsenide, the possibility of 15 percent end-of-life efficiencies for silicon, increasing radiation resistance in gallium arsenide, annealing of radiation damage and the need for radiation damage studies in cascade cells. The workshop members agreed that a high priority should be assigned to obtaining equivalent electron fluences for gallium arsenide cells. It was suggested that 1 MeV would be a reasonable electron energy for this purpose. Special care should be given to proton irradiations particularly for energies below 1 MeV. In addition, omnidirectional rather than normal incidence protons should be used. It was also agreed that there was a need for obtaining damage coefficients in gallium arsenide. In silicon, there is a requirement for additional flight data, especially in proton dominated orbits. These data are needed to further check the accuracy of the 1 MeV equivalence fluences.

L.F.M.

N83-15838*# Jet Propulsion Lab., California Inst. of Tech., Pasadena

BLANKET TECHNOLOGY

J. SCOTT-MONCK *In* NASA. Lewis Research Center Space Photovoltaic Res. and Technol. 1982: High Efficiency, Radiation Damage, and Blanket Technol. p 269-272 1982
Avail: NTIS HC A12/MF A01 CSCL 10A

It was concluded that systems requirements would force a reassessment of the conventional approach to interconnecting cells into blanket or array modules. Defense applications (hardening) were identified as the key requirement that would force a movement away from the standard method (solder) of forming array circuits. The panel also agreed that requirements associated with the impending NASA Space Station and in-bound missions would lead to alternative interconnecting approaches. It was concluded that

the diverse requirements of future space missions (high temperature and extended thermal cycling) might not be met by one approach, such as parallel-gap resistance welding. The panel suggested that other options such as high temperature solders and brazing be considered for the various mission requirements that were anticipated. The panel agreed that blanket technology was potentially suitable for in-orbit annealing to temperatures of 200 C provided that conventional soldered connecting techniques were replaced by 'welding'. L.F.M.

N83-15840*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

THE WORLDWIDE MARKET FOR PHOTOVOLTAICS IN THE RURAL SECTOR

W. A. BRAINARD 1982 15 p refs Presented at 16th Photovoltaic Specialists Conf., San Diego, Calif., 27-30 Sep. 1982; sponsored by IEEE (Contract DE-AI01-79ET-20485)

(NASA-TM-83035; E-1473; DOE/NASA/20485-13; NAS 1.15.83035) Avail: NTIS HC A02/MF A01 CSCL 10A

The worldwide market for stand-alone photovoltaic power systems in three specific segments of the rural sector were determined. The worldwide market for photovoltaic power systems for village power, cottage industry, and agricultural applications were addressed. The objectives of these studies were to: The market potential for small stand-alone photovoltaic power system in specific application areas was assessed Technical, social and institutional barriers to PV utilization were identified. Funding sources available to potential users was also identified and marketing strategies appropriate for each sector were recommended to PV product manufacturers. The studies were prepared on the basis of data gathered from domestic sources and from field trips to representative countries. Both country-specific and sector-specific results are discussed, and broadly applicable barriers pertinent to international marketing of PV products are presented. S.L.

N83-15865*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

DIRECT CONVERSION OF INFRARED RADIANT ENERGY FOR SPACE POWER APPLICATIONS Final Report

R. C. FINKE /in R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol 2 22 p 1982

Avail: NTIS HC A99/MF A01

A proposed technology to convert the earth radiant energy (infrared albedo) for spacecraft power is presented. The resultant system would eliminate energy storage requirements and simplify the spacecraft design. The design and performance of a infrared rectenna is discussed. M.G.

N83-15868*# Rice Univ., Houston, Tex. Dept. of Space Physics and Astronomy.

INTERACTION BETWEEN THE SPS SOLAR POWER SATELLITE SOLAR ARRAY AND THE MAGNETOSPHERIC PLASMA Final Report

J. W. FREEMAN /in R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 2 18 p 1982 refs (Contract NAS8-33023)

Avail: NTIS HC A99/MF A01

The results of study to determine the effects of space plasmas on a large GaAs solar cell array using solar reflectors at a concentration ratio of two in geostationary orbit are summarized. It was concluded that the system could function in the GEO environment if certain design changes were implemented. These included conductive coatings on the solar cells, changing the reflector material from Kapton to a higher conductivity material, and oversizing the array to compensate for a 0.7% parasitic load due to losses from the ambient magnetospheric plasma. The operation of the solar powered earth orbit transfer vehicle (EOTV) was also examined and it was concluded that LEO servere arcing would take place on all high voltage negative portions of the

array. The parasitic load loss at LEO was estimated at 3%. Operation of a high voltage array at LEO represents a major problem. Charge exchange ion feedback from argon ion thrusters located near the EOTV solar array was also examined and all problems found were believed to be solvable by the placement of protective ground screens. M.G.

N83-15899# Army Construction Engineering Research Lab., Champaign, Ill. Energy Systems Div.

OVERVIEW OF PASSIVE SOLAR DESIGN TECHNIQUES Final Report

D. M. JONCICH Sep. 1982 43 p refs (AD-A119993; CERL-SR-E-179) Avail: NTIS HC A03/MF A01 CSCL 13A

This report presents an overview of the fundamental terminology, concepts, and techniques related to passive solar technology, and provides examples of passive strategies which can be incorporated into the inventory of Army buildings. GRA

N83-15902# Naval Weapons Center, China Lake, Calif.

FLAT PLATE PHOTOVOLTAIC POWER SYSTEMS: DESCRIPTION, DESIGN AND COST

M. R. HALL, G. D. SMITH, and D. L. HOLMES Jul. 1982 121 p refs

(AD-A120814; NWC-TP-6381) Avail: NTIS HC A06/MF A01 CSCL 10B

The Energy Program Office at the Naval Weapons Center has been tasked to manage the Department of the Navy's photovoltaic effort. This effort includes participation in the Federal Photovoltaic Utilization Program (FPUP), which is sponsored by the Department of Energy, and encouragement of worldwide Navy activities to use Navy funds to procure cost-effective photovoltaic power systems. This report describes in simple nontechnical terms what photovoltaic power systems are, how they are sized, their costs, and their advantages and disadvantages. It also includes all tables and information necessary for the nontechnical person to determine preliminary sizes and costs of photovoltaic power systems for most applications. Navy activities can identify cost-effective applications for photovoltaic power systems by using this report and can procure the systems on their own or seek assistance from the Energy Program Office. The Energy Program Office will assist in preparing procurement specifications, evaluating proposals, awarding and monitoring contracts, and acceptance-testing the systems. Author (GRA)

N83-15904# Air Force Academy, Colo.

SIMPLIFIED SOLAR FRACTION ESTIMATION FOR SPACE AND WATER HEATING AT DEPARTMENT OF DEFENSE INSTALLATIONS. APPENDIX C: WATER HEATING NOMOGRAPHS Final Report

N. S. PACHECO, D. G. KNIOLA, J. F. SHEEDY, and R. J. SCARI Sep. 1982 201 p refs (AD-A120014; USAFA-TR-82-6-APP-C) Avail: NTIS HC A10/MF A01 CSCL 13A

This report contains a set of nomographs which can be used to estimate the average annual solar fraction for solar space and water heating at a large number of DOD facilities. The solar fraction estimated from the nomograph is in close agreement with F-Chart 3.0 and allows for variation of the following parameters: annual load, collector area, collector transmittance-absorptance coefficient, and collector overall loss coefficient. GRA

N83-15905# Air Force Academy, Colo.

SIMPLIFIED SOLAR FRACTION ESTIMATION FOR SPACE AND WATER HEATING AT DEPARTMENT OF DEFENSE INSTALLATIONS. APPENDIX B: SPACE HEATING NOMOGRAPHS Final Report

N. S. PACHECO, D. G. KNIOLA, J. F. SHEEDY, and R. J. SCARI Sep. 1982 205 p refs (AD-A120013; USAFA-TR-82-6-APP-B) Avail: NTIS HC A10/MF A01 CSCL 13A

This report contains a set of nomographs which can be used to estimate the average annual solar fraction for solar space and

02 SOLAR ENERGY

water heating at a large number of DOD facilities. The solar fraction estimated from the nomograph is in close agreement with F-Chart 3.0 and allows for variation of the following parameters: annual load, collector area, collector transmittance-absorptance coefficient, and collector overall loss coefficient. GRA

N83-15906# Air Force Academy, Colo.
SIMPLIFIED SOLAR FRACTION ESTIMATION FOR SPACE AND WATER HEATING AT DEPARTMENT OF DEFENSE INSTALLATIONS Final Report
N. S. PACHECO, D. G. KNIOLA, J. F. SHEEDY, and R. J. SCARI
Sep. 1982 27 p refs
(AD-A120012; USAFA-TR-82-6) Avail: NTIS HC A03/MF A01
CSCL 13A

This report contains a set of nomographs which can be used to estimate the average annual solar fraction for solar space and water heating at a large number of DOD facilities. The solar fraction estimated from the nomograph is in close agreement with F-Chart 3.0 and allows for variation of the following parameters: annual load, collector area, collector transmittance absorption coefficient, and collector overall loss coefficient. GRA

N83-15922# Bendix Corp., Sylmar, Calif. Energy, Environment and Technology Office.
DESCRIPTION OF THE 3 MW SWT-3 WIND TURBINE AT SAN GORGONIO PASS CALIFORNIA
S. C. RYBAK /in Midwest Res. Inst. Fifth Bien. Wind Energy Conf. and Workshop (WW5) p 193-206 1981
Avail: NTIS HC A23/MF A01

The SWT-3 wind turbine is a microprocessor controlled three bladed variable speed upwind machine with a 3MW rating that is presently operational and undergoing system testing. The tower, a rigid triangular truss configuration, is rotated about its vertical axis to position the wind turbine into the prevailing wind. The blades rotate at variable speed in order to maintain an optimum 6:1 tip speed ratio between cut in and rated wind velocity thereby maximizing power extraction from the wind. Rotor variable speed is implemented by the use of a hydrostatic transmission consisting of fourteen fixed displacement pumps operating in conjunction with eighteen variable displacement motors. Full blade pitch with on-off hydraulic actuation is used to maintain 3MW of output power between rated wind velocity of 40 mph and the cut-out wind velocity of 55 mph. S.L.

N83-15924# United Technologies Research Center, East Hartford, Conn.

DOE/UTRC KW DEVELOPMENT PROGRAM

M. C. CHENEY /in Midwest Res. Inst. Fifth Bien. Wind Energy Conf. and Workshop (WW5) p 257-270 1981 refs
Avail: NTIS HC A23/MF A01

A 15 kW wind turbine for farm and industrial applications was developed. The design represented an extension of the 8 kW bearingless rotor wind turbine. However, several modifications were incorporated to improve the producibility, reduce costs, and improve the appearance and operating characteristics. These consisted of an integrated transmission to eliminate a separate support frame, the use of a single off the shelf turret bearing replacing the twin bearing yaw assembly, and replacing the guyed tower with a free standing tapered tower. The prototype machine has a diameter of 48 ft and uses a single phase induction generator rated at 23 kW. The hub height is 55 ft. The measured power output at the UTRC test site has been 6 kW at 5.4 m/s (12 mph) and 15 kW at 9 m/s (20 mph). The energy capture at 5.4 m/s is estimated to be 54,850 kWh. S.L.

N83-15942# Sandia Corp., Albuquerque, N. Mex.

SOL-GEL PROTECTIVE COATINGS FOR BLACK CHROME SOLAR SELECTIVE FILMS

R. B. PETTIT and C. J. BRINKER 1981 18 p refs Presented at SPIE Optical Coatings for Energy Efficiency and Solar Appl. Conf., Los Angeles, Calif., 25 Jan. 1982
(Contract DE-AC04-76DP-00789)
(DE82-004138; SAND-81-1889C; CONF-820107-1) Avail: NTIS HC A02/MF A01

Electrodeposited black chrome solar selective films degrade rapidly when heated to temperatures above 300 C in air. The application of sol-gel protective coatings to the black chrome films was investigated as a possible means to improve the oxidation resistance of black chrome at high temperatures. The sol-gel coating process consists of applying an alcoholic solution containing polymeric glass precursors. After the coating is fired for about one-half hour at a moderate temperature (approximately 450 C), a glass layer is obtained. Because of the wide range of sol-gel processing parameters, initial studies concentrated on determining the effect of the following variables on the thermal stability of sol-gel coated black chrome: sol-gel composition; firing temperature; firing atmosphere; sol-gel coating thickness; and pre-aging of the black chrome films. Of the compositions studied, only SiO₂/B₂O₃ and SiO₂/B₂O₃/Na₂O/BaO resulted in improved thermal stability. R J F.

N83-15953# Sandia Labs., Albuquerque, N. Mex.

LIFETIME AND EFFECTIVE SURFACE RECOMBINATION VELOCITY MEASUREMENTS IN HIGH-EFFICIENCY SI SOLAR CELLS

B. H. ROSE 1981 4 p refs Presented at the Intern. Electron Devices Meeting, Washington, D. C., 7 Dec 1981
(Contract DE-AC04-76DP-00789)
(DE81-030361; SAND-81-2090C; CONF-811207-1) Avail: NTIS HC A02/MF A01

A conventional analysis method, based on minority carrier diffusion in a solar cell base, is used to obtain bulk lifetime (τ) and effective back-surface recombination velocity (S) from measurements of asymptotic decay times of short-circuit current and open circuit voltage. Since the decay times depend individually on both S and τ , it is necessary to use both current and voltage data for unique results. Experimental measurements of current and voltage transients are presented from variable base resistivity cells, irradiated cells and cells with intentionally damaged back surface field regions. These cells exhibit lifetimes from one to several hundred microseconds and recombination velocities from 100 to 5000 cm/sec. All features of the data are accounted for by the analysis. DOE

03

HYDROGEN

Includes hydrogen production, storage, and distribution.

A83-11794* Jet Propulsion Lab., California Inst. of Tech., Pasadena.

CATALYTIC AUTOTHERMAL REFORMING INCREASES FUEL CELL FLEXIBILITY

M. FLYTZANI-STEPHANOPOULOS and G. E. VOECKS (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA) Energy Progress, vol. 1, Dec. 1981, p 52-58 refs
(Contract ET-78-A-03-2042)

Experimental results are presented for the autothermal reforming (ATR) of n-hexane, n-tetradecane, benzene and benzene solutions of naphthalene. The tests were run at atmospheric pressure and at moderately high reactant preheat temperatures in the 800-900 K range. Carbon formation lines were determined for paraffinic and aromatic liquids. Profiles were determined for axial bed temperature and composition. Space velocity efforts were

assessed, and the locations and types of carbon were recorded. Significant reactive differences between hydrocarbons were identified. Carbon formation characteristics were hydrocarbon specific. The differing behavior of paraffinic and aromatic fuels with respect to their carbon formation may be important in explaining the narrow range of carbon-free operating conditions found in the ATR of number two fuel oil. S.C.S.

A83-12295

PARTICLE SIZE DISTRIBUTION OF NI MICROPRECIPITATES IN LANI5 USED FOR HYDROGEN STORAGE

R. L. COHEN, R. C. SHERWOOD, and K. W. WEST (Bell Telephone Laboratories, Inc., Murray Hill, NJ) *Applied Physics Letters*, vol. 41, Nov. 15, 1982, p. 999-1001. refs

LaNi₅ is an intermetallic compound which absorbs and desorbs hydrogen at convenient temperatures and pressures. It has been used for storing hydrogen fuel, and, using the heat of absorption, for various pump and heat engine applications. Recurrent absorption and desorption of hydrogen produces a phase separation into nickel metal and lanthanum hydride. It is shown, from the magnetic behavior of degraded LaNi₅, that a bimodal particle size distribution is present with all particles smaller than 100 cubic angstroms. The magnetic properties may be useful for determining the condition of LaNi₅ in a reservoir. (Author)

A83-12508*# Michigan State Univ., East Lansing.

MEASUREMENTS OF ENERGY DISTRIBUTION AND THRUST FOR MICROWAVE PLASMA COUPLING OF ELECTRICAL ENERGY TO HYDROGEN FOR PROPULSION

T. MORIN, R. CHAPMAN, J. FILPUS, M. HAWLEY, R. KERBER, J. ASMUSSEN (Michigan State University, East Lansing, MI), and S. NAKANISHI (NASA, Lewis Research Center, Cleveland, OH) *AIAA, Japan Society for Aeronautical and Space Sciences*, and *DGLR, International Electric Propulsion Conference*, 16th, New Orleans, LA, Nov. 17-19, 1982, *AIAA* 12 p. (*AIAA PAPER* 82-1951)

A microwave plasma system for transfer of electrical energy to hydrogen flowing through the system has potential application for coupling energy to a flowing gas in the electrothermal propulsion concept. Experimental systems have been designed and built for determination of the energy inputs and outputs and thrust for the microwave coupling of energy to hydrogen. Results for experiments with pressure in the range 100 microns-6 torr, hydrogen flow rate up to 1000 micronmoles/s, and total absorbed power to 700 w are presented. (Author)

A83-16041

OPERATION OF A STEADY-STATE PH-DIFFERENTIAL WATER ELECTROLYSIS CELL

O. TESCHKE and M. G. ZWANZIGER (Campinas, Universidade Estadual, Campinas, Sao Paulo, Brazil) *International Journal of Hydrogen Energy*, vol. 7, no. 12, 1982, p. 933-937. refs

The design features and experimental results with a steady-state electrolysis cell using an acid pH at the cathode and a basic condition at the anode are described. The differential pH concentrations were configured to obtain water decomposition voltages lower than the nominal 1.23 V at 1 atm and 25 C. Oxygen evolution occurs 0.8 V less anodic at a pH of 14 than at a pH of 0, while lower voltage is needed for hydrogen evolution in an acidic solution. The pH differential was set up with an external water feed in the test cell. The anode and cathode were positioned on either side of a solid polymer electrolyte sheet. The trials were run with pure water in circulating, closed systems, with KOH in a closed system, and with KOH in a circulating system. Lowered electricity consumption was demonstrated, although none of the configurations showed a favorable energy balance. M.S.K.

A83-16042

PRODUCTION OF HYDROGEN BY DIRECT THERMAL DECOMPOSITION OF WATER - PRELIMINARY INVESTIGATIONS

J. LEDE, F. LAPICQUE, J. VILLERMAUX (CNRS, Laboratoire des Sciences du Genie Chimique, Nancy, France), B. CALES, A. OUNALLI, J. F. BAUMARD, and A. M. ANTHONY (CNRS, Centre de Recherches sur la Physique des Hautes Temperatures, Orleans, France) *International Journal of Hydrogen Energy*, vol. 7, no. 12, 1982, p. 939-950. Research supported by the Centre National de la Recherche Scientifique. refs

Preliminary results from examinations of two techniques to effect solar thermal decomposition of water and then prevent recombination, as part of the French PIRDES program, are reported. A solar furnace simulator was fabricated with a 4 kW lamp shining light on elliptic mirrors which redirected the light to a focus to produce temperatures of 3000 K. Reaction studies have shown that significant hydrogen evolution occurs only at temperatures above 2000 K. Water injected into a zirconia nozzle at the focus rose to 2300 K and began dissociating within 0.001-0.01 sec. One experiment comprised water vapor with argon gas, pure water, and two types of nozzles (one perforated). Evolved hydrogen increased with increased stirring of the water feed, but decreased with increasing flow rate. Use of membrane semipermeable to oxygen around the zirconia nozzle demonstrated that the hydrogen flow rate depended on the electrical characteristics of the membrane. Good agreement was found between theoretical predictions and the hydrogen evolution rates in all the configurations. M.S.K.

A83-16044

HYDROGEN AS A VECTOR FOR CENTRAL RECEIVER SOLAR UTILITIES

E. BILGEN (Exergy Research Corp., Montreal, Canada) and C. BILGEN (Exergy Research Corp., Montreal, Canada) *International Journal of Hydrogen Energy*, vol. 7, no. 12, 1982, p. 977-984. Research supported by the Central Mortgage and Housing Corp. refs

The production of hydrogen and hydrogen-rich fuels from water and raw petroleum and gas products by means of a central receiver solar utility plant is examined. The fuels produced would be employed for both industrial and domestic purposes. The latter is also considered as a market for the low-grade heat with small heliostat-central receiver configurations. The total system efficiencies for conversion of solar radiation to heat are calculated, as are the thermodynamic balances of water decomposition. Attention is given to the hybrid sulfuric acid, sulfuric acid-hydrogen bromide, and the sulfuric acid-hydrogen iodine cycles, noting that the last has an overall thermal efficiency of 50 percent. An initial outline of a solar hydrogen plant is provided, indicating annual hydrogen production costs of \$18.2/GJ for a thermomechanical process and \$20.7/GJ for a solar thermal electrolysis process in the 1990s. M.S.K.

N83-10501* National Aeronautics and Space Administration. Pasadena Office, Calif.

THERMAL REACTOR Patent

H. LEVIN (JPL, California Inst. of Technology, Pasadena) and L. B. FORD, inventors (to NASA) (JPL, California Inst. of Technology, Pasadena) 29 Feb. 1980 9 p. Filed 29 Feb. 1980. Supersedes N80-20338 (80 - 11, p. 1389). Sponsored by NASA. (NASA-CASE-NPO-14369-1; US-PATENT-4,343,772; US-PATENT-APPL-SN-126063; US-PATENT-CLASS-422-200; US-PATENT-CLASS-422-202; US-PATENT-CLASS-422-224; US-PATENT-CLASS-55-204) Avail: US Patent and Trademark Office CSCL 10A

A thermal reactor apparatus and method of pyrolytically decomposing silane gas into liquid silicon product and hydrogen by-product gas is disclosed. The thermal reactor has a reaction chamber which is heated well above the decomposition temperature of silane. An injector probe introduces the silane gas tangentially into the reaction chamber to form a first, outer, forwardly moving vortex containing the liquid silicon product and a second, inner,

03 HYDROGEN

reawardly moving vortex containing the by-product hydrogen gas. The liquid silicon in the first outer vortex deposits onto the interior walls of the reaction chamber to form an equilibrium skull layer which flows to the forward or bottom end of the reaction chamber where it is removed. The by-product hydrogen gas in the second inner vortex is removed from the top or rear of the reaction chamber by a vortex finder. The injector probe which introduces the silane gas into the reaction chamber is continually cooled by a cooling jacket Official Gazette of the U.S. Patent and Trademark Office

N83-10560*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio
COMBUSTION CHARACTERISTICS OF HYDROGEN. CARBON MONOXIDE BASED GASEOUS FUELS
J. J. NOTARDONATO, D. J. WHITE (Solar Turbines Inc.), A. J. KUBASCO (Solar Turbines Inc.), and R. T. LECREN (Solar Turbines Inc.) 21 Oct. 1981 16 p refs Presented at the Joint Power Conf., Denver, 17-21 Oct. 1982
(Contract DE-AI01-77ET-13111)
(NASA-TM-82998; E-1434; NAS 1 15 82998,
DOE/NASA/13111-13) Avail: NTIS HC A02/MF A01 CSDL 21D

An experimental rig program was conducted with the objective of evaluating the combustion performance of a family of fuel gases based on a mixture of hydrogen and carbon monoxide. These gases, in addition to being members of a family, were also representative of those secondary fuels that could be produced from coal by various gasification schemes. In particular, simulated Winkler, Lurgi, and Blue-water low and medium energy content gases were used as fuels in the experimental combustor rig. The combustor used was originally designed as a low NO_x rich-lean system for burning liquid fuels with high bound nitrogen levels. When used with the above gaseous fuels this combustor was operated in a lean-lean mode with ultra long residence times. The Blue-water gas was also operated in a rich-lean mode. The results of these tests indicate the possibility of the existence of an 'optimum' gas turbine hydrogen - carbon monoxide based secondary fuel. Such a fuel would exhibit NO_x and high efficiency over the entire engine operating range. It would also have sufficient stability range to allow normal light-off and engine acceleration. Solar Turbines Incorporated would like to emphasize that the results presented here have been obtained with experimental rig combustors. The technologies generated could, however, be utilized in future commercial gas turbines. B.W.

N83-12206# Oak Ridge National Lab., Tenn. Chemical Technology Div.
PHOTOSYNTHETIC WATER SPLITTING Annual Report, Jan. - Dec. 1981
E. GREENBAUM Jan. 1982 21 p refs
(Contract GRI-5080-361-0368)
(PB82-200684, GRI-81/0036; ORNL/TM-8320) Avail: NTIS HC A02/MF A01 CSDL 07D

The basic physics and chemistry of photosynthetic hydrogen and oxygen production are examined. During this reporting period, the first measurements of the turnover times and photosynthetic unit sizes of steady state simultaneous photoproduction of hydrogen and oxygen have been determined. The results for the turnover times are encouraging because they demonstrate that the values for the hydrogen and oxygen photoreactions are kinetically compatible and are about the same as the turnover times for normal photosynthesis. The major limiting aspect of the hydrogen and oxygen photoreactions is the number of apparent functional photosynthetic units. Studies on the long-term stability and endurance of hydrogen and oxygen photoproduction in anaerobically adapted green algae have also been performed. Preliminary results indicate that these organisms are extremely rugged and may be of eventual use in practical applications.

GRA

N83-13276# Department of Energy, Washington, D. C. Office of the Assistant Secretary for Conservation and Renewable Energy

SUMMARY OF DOE HYDROGEN PROGRAM FY-1981 BY THE HYDROGEN ENERGY COORDINATING COMMITTEE

Jul. 1982 52 p

(DE82-020494; DOE/CE-034) Avail: NTIS HC A04/MF A01

Hydrogen, as an energy storage medium and as a general purpose fuel is emphasized. The production, storage, and use of hydrogen as a mobile fuel, as a stationary fuel, as a fuel feedstock, or as a chemical feedstock is studied, individual elements of the hydrogen program are described. DOE

N83-13593# Teledyne Energy Systems, Timonium, Md. **ADVANCED ALKALINE ELECTROLYSIS CELL DEVELOPMENT. DEVELOPMENT OF ELECTROLYSIS OPERATION CELL SEPARATOR FOR 1250C Summary Report**

J. N. MURRAY Apr. 1982 126 p refs Prepared for Brookhaven National Lab., Upton, N.Y.

(Contract DE-AC02-76CH-00016)

(DE82-020697, BNL-51573) Avail: NTIS HC A07/MF A01

The development of an electrode separator that will allow continuous water electrolysis at 1250C is described. This separator has nearly identical mechanical characteristics relative to the existing commercial asbestos separator which appears to be limited chemically to operation below 900C. Additional insight into the requirements for an improved anode structure and progress in anode improvements is also discussed. The reporting requirements for participation as part of the International Energy Agency hydrogen production research and development program are included. DOE

N83-14204# Spectron Development Labs., Inc., Costa Mesa, Calif.

PARTICULATE PROCESSES IN PULVERIZED COAL FLAMES Quarterly Technical Progress Report, Apr. - Oct. 1981

30 Oct. 1981 56 p refs

(Contract DE-AC22-80PC-30300)

(DE82-003370; DOE/PC/30300/T4) Avail: NTIS HC A04/MF A01

The experiment plan, the design and fabrication of the 2 color pyrometer system, and the conduct and assessment of preliminary observations of ignition and devolatilization are described. The fabrication and assembly of the furnace was completed. Initial checkout and characterization runs are in progress. The interfacing of the instrumentation with the experiment is also in progress. Experimental observations of ignition and devolatilization of Pittsburgh Seam HVA bituminous coal were initiated. Observations using both front and back light pulsed laser holography and particle sizing interferometry were made. Experiments were completed using both 80 micron and 15 micron particles. Analysis of the data holograms indicate that high quality resolution has been achieved, which will allow the observation of detail not heretofore achieved. DOE

N83-14303# Brookhaven National Lab., Upton, N. Y. **HYDROGEN RECOVERY FROM SUPPLEMENTED NATURAL GAS BY METAL HYBRIDES**

D. T. J. HUANG, F. REIDINGER, and F. B. HILL 1981 7 p refs Presented at the Ann. Contractors' Rev. Meeting on Thermal and Chem. Storage, Tysons Corner, Va., 16 Sep. 1981

(Contract DE-AC02-76CH-00016)

(DE82-002245; BNL-30057; CONF-810940-28) Avail: NTIS HC A02/MF A01

A metal hydride process employing LaNi₄ 7Al_{0.3} for recovery of hydrogen from supplemented natural gas is discussed. Experimental studies involved determination of the equilibrium hydrogen capacity of the alloy, measurement of the adsorption behavior of contaminant gases, and measurement of rates of hydrogen absorption by the alloy. The results were used as the basis for a preliminary process design and cost estimate DOE

04 FUELS AND OTHER SOURCES OF ENERGY

N83-15958# Los Alamos Scientific Lab., N. Mex.
USE OF OXIDE DECOMPOSITIONS IN ADVANCED THERMOCHEMICAL HYDROGEN CYCLES FOR SOLAR HEAT SOURCES. EXPERIMENTAL RESULTS ON THE LOW-TEMPERATURE REACTIONS FOR THE TRICOBALT TETRAOXIDE-COBALT MONOXIDE PAIR

W. M. JONES and M. G. BOWMAN 1982 9 p refs Presented at the World Hydrogen Energy Conf., Pasadena, Calif., 13-17 Jun. 1982

(Contract W-7405-ENG-36)

(DE82-002390; LA-UR-81-2927; CONF-820605-3) Avail: NTIS HC A02/MF A01

The concept of utilizing oxide decompositions in advanced thermochemical hydrogen cycles for solar heat sources is introduced. It has particular interest in allowing direct transmission of energy to the process through an air window. A cycle for the Co₃O₄-CoO pair would be, schematically: (1) Co₃O₄ = 3CoO + 1/2 O₂; (2) I₂(s,1) + Mg(OH)₂ + 3CoO = MgI₂(aq) + Co₃O₄ + H₂O(l); (3) H₂O + MgI₂(aq) = MgO + 2HI; (4) 2 HI = H₂ + I₂; (5) MgO + H₂O = Mg(OH)₂. Reaction (2) should give a high concentration of MgI₂ that would be favorable for (3). The solutions would also contain iodine dissolved as polyiodide, partly offsetting this advantage. Preliminary results are indicated. DOE

N83-16153*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

ANALYSIS OF COMBUSTION SPECTRA CONTAINING ORGAN PIPE TONE BY CEPSTRAL TECHNIQUES

J. H. MILES and C. A. WASSERBAUER 1982 29 p refs Presented at the 104th Meeting of the Acoustical Soc. of Am., Orlando, Fla., 8-12 Nov. 1982

(NASA-TM-83034; E-1472; NAS 1.15:83034) Avail: NTIS HC A03/MF A01 CSCL 20A

Signal reinforcements and cancellations due to standing waves may distort constant bandwidth combustion spectra. Cepstral techniques previously applied to the ground reflection echo problem are used to obtain smooth broadband data and information on combustion noise propagation. Internal fluctuating pressure measurements made using a J47 combustor attached to a 6.44 m long duct are analyzed. Measurements made with Jet A and hydrogen fuels are compared. The acoustic power levels inferred from the measurements are presented for a range of low heat release rate operating conditions near atmospheric pressure. For these cases, the variation with operating condition of the overall acoustic broadband power level for both hydrogen and Jet A fuels is consistent with previous results showing it was proportional to the square of the heat release rate. However, the overall acoustic broadband power level generally is greater for hydrogen than for Jet A. S.L.

04

FUELS AND OTHER SOURCES OF ENERGY

Includes fossil fuels, nuclear fuels, geothermal and ocean thermal energy, tidal energy, and wind energy.

A83-10030

APPLICATIONS OF REMOTE SENSING TO PETROLEUM EXPLORATION

M. T. HALBOUTY In: International Geoscience and Remote Sensing Symposium, Washington, DC, June 8-10, 1981, Digest. Volume 1. New York, Institute of Electrical and Electronics Engineers, 1981, p. 305-311. refs

The application of remote sensing using Landsat imagery to petroleum exploration is discussed. It is shown that Landsat imagery can be used effectively to outline sedimentary terrains and to determine the areal distribution of key strata and their relation to regional structure. In addition, it is proposed that the US government undertake a program to develop improved petroleum exploration

techniques that are beyond the scope of industry, while also obtaining global energy information which can be used to evaluate energy alternatives and to formulate energy policy, as well as to evaluate areas for exploration. It is recommended that a stereoscopic imaging satellite be flown as soon as possible by NASA in order to acquire global data for analysis of energy related geologic structures. N.B.

A83-10031* Arkansas Univ., Fayetteville.

EXPLORATION FOR FRACTURED PETROLEUM RESERVOIRS USING RADAR/LANDSAT MERGE COMBINATIONS

H. MACDONALD, W. WAITE, M. BORENGASSER, D. TOLMAN (Arkansas University, Fayetteville, AR), and C. ELACHI (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA) In: International Geoscience and Remote Sensing Symposium, Washington, DC, June 8-10, 1981, Digest. Volume 1. New York, Institute of Electrical and Electronics Engineers, 1981, p. 312-317.

(Contract JPL-955048)

Since fractures are commonly propagated upward and reflected at the earth's surface as subtle linears, detection of these surface features is extremely important in many phases of petroleum exploration and development. To document the usefulness of microwave analysis for petroleum exploration, the Arkansas part of the Arkoma basin is selected as a prime test site. The research plan involves comparing the aircraft microwave imagery and Landsat imagery in an area where significant subsurface borehole geophysical data are available. In the northern Arkoma basin, a positive correlation between the number of linears in a given area and production from cherty carbonate strata is found. In the southern part of the basin, little relationship is discernible between surface structure and gas production, and no correlation is found between gas productivity and linear proximity or linear density as determined from remote sensor data. C.R.

A83-10032* Jet Propulsion Lab., California Inst. of Tech., Pasadena.

REMOTE SENSING AND URANIUM EXPLORATION AT LISBON VALLEY, UTAH

J. E. CONEL (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA) and P. L. NIESEN (Atlas Corp., Moab, UT) In: International Geoscience and Remote Sensing Symposium, Washington, DC, June 8-10, 1981, Digest. Volume 1. New York, Institute of Electrical and Electronics Engineers, 1981, p. 318-324. refs

(Contract NAS7-100)

As part of the joint NASA-Geosat uranium test case program, aircraft-acquired multispectral scanner data are used to investigate the distribution of bleaching in Windgate sandstone exposed in Lisbon Valley anticline, Utah. It is noted that all of the large ore bodies contained in lower Chinle Triassic age or Cutler Permian age strata in this area lie beneath or closely adjacent to such bleached outcrops. The geographic coincidences reported here are seen as inviting renewed interest in speculation of a causal relation between occurrences of Mississippian-Pennsylvanian oil and gas in this area and of Triassic uranium accumulation and rock bleaching. C.R.

A83-10041

APPLICATIONS OF REMOTE SENSING TO WIND POWER FACILITY SITING

J. E. WADE, C. L. ROSENFELD, and P. A. MAULE (Oregon State University, Corvallis, OR) In: International Geoscience and Remote Sensing Symposium, Washington, DC, June 8-10, 1981, Digest. Volume 1. New York, Institute of Electrical and Electronics Engineers, 1981, p. 443-448.

A method by which wind energy prospectors can use remote sensing to rapidly examine extensive geographical areas to identify potential wind turbine generators' sites is outlined. Remote sensing in wind prospecting is not being considered as a tool for determining wind power potential but, rather, as an aid in identifying terrestrial, marine, and atmospheric characteristics associated with desirable wind power sites. It is noted that locations with interesting features

04 FUELS AND OTHER SOURCES OF ENERGY

noted in a regional assessment can be more closely evaluated using medium-scale imagery, which can be acquired from a number of different agencies, among them the U.S. Forest Service, the Bureau of Land Management, Water and Power Resources and the Soil Conservation Service. Once specific locations have been identified from small- and medium-scale imagery, low-level aerial reconnaissance in a locally chartered aircraft can verify the information obtained. Wind-deformed trees, active slip faces on dunes, snow cornices, snow fences, and the slopes of ridges can be evaluated. C.R.

A83-10115

THE 100 DAYS OF SEASAT-A

S. W. MCCANDLESS, JR. (User Systems Engineering, Annandale, VA) In: International Geoscience and Remote Sensing Symposium, Washington, DC, June 8-10, 1981, Digest. Volume 2 New York, Institute of Electrical and Electronics Engineers, 1981, p. 1401-1406.

The accomplishments of Seasat-A are reviewed. The radar altimeter monitored average wave height to within 0.5 to 1 meter along a 2 to 12 m swath, and measured changes in the ocean geoid to a precision of 10 cm. The radar scatterometer measured wind speeds from 3 to 28 m/sec within 2 m/sec and direction within 20 deg over two 500 km swaths. The five-frequency microwave radiometer measured surface temperature by measuring the microwave brightness of the surface to within 1 C, measured foam brightness which can be converted into a measurement of high wind speed, mapped ice coverage, and provided atmospheric correction data to the active radars by measuring liquid and gaseous water content in the upper atmosphere. The Synthetic Aperture Radar provided detailed images of open ocean, coastal, inland geology and culture, and ice-covered regions. Relevant oceanographic satellite applications include offshore oil and gas, environmental forecasting, marine transportation, deep ocean mining, and marine fisheries. C.D.

A83-10658#

DEVELOPING TECHNOLOGIES FOR SYNTHETIC FUELS

F. B. SPROW (Exxon Research and Engineering Co., Florham Park, NJ) Journal of Energy, vol. 6, Nov.-Dec. 1982, p. 413-417.

(Previously cited in issue 14, p. 2395, Accession no. A81-32907)

A83-11050*# Southwest Research Inst., San Antonio, Tex.

TESTS OF BLENDING AND CORRELATION OF DISTILLATE FUEL PROPERTIES

J. ERWIN and J. N. BOWDEN (Southwest Research Institute, San Antonio, TX) American Institute of Chemical Engineers, Summer National Meeting, Cleveland, OH, Aug. 29-Sept. 1, 1982, Paper. 38 p.

(Contract NAS3-22783)

The development of a fuel test matrix, results from tests of several blends of distillate aircraft fuels, and the use of correlations in formulation determination during a NASA-sponsored program to identify new aircraft fuels are described. The program was initiated in order to characterize fuel blends which are appropriate for different types of combustors in use and under development. The fuels were required to feature a specified range of properties. Attention is given to fuel volatility, hydrogen content, aromatic content, freezing point, kinematic viscosity, and naphthalene content. Paraffinic and naphthenic base stocks were employed, using alkyl benzene, naphthene benzenes, and naphthalenes to adjust the blend properties. Categories for the test fuels comprised source-controlled and composition controlled fuels. Test results and compositions of various fuels are provided. M.S.K.

A83-11482*# Utah Univ., Salt Lake City.

A CARBON-13 AND PROTON NUCLEAR MAGNETIC RESONANCE STUDY OF SOME EXPERIMENTAL REFEREE BROADENED-SPECIFICATION /ERBS/ TURBINE FUELS

D. K. DALLING and R. J. PUGMIRE (Utah, University, Salt Lake City, UT) American Institute of Chemical Engineers, Summer National Meeting, Cleveland, OH, Aug. 29-Sept. 1, 1982, Paper. 20 p. refs

(Contract NAG3-27)

Preliminary results of a nuclear magnetic resonance (NMR) spectroscopy study of alternative jet fuels are presented. A referee broadened-specification (ERBS) aviation turbine fuel, a mixture of 65 percent traditional kerosene with 35 percent hydrotreated catalytic gas oil (HCGO) containing 12.8 percent hydrogen, and fuels of lower hydrogen content created by blending the latter with a mixture of HCGO and xylene bottoms were studied. The various samples were examined by carbon-13 and proton NMR at high field strength, and the resulting spectra are shown. In the proton spectrum of the 12.8 percent hydrogen fuel, no prominent single species is seen while for the blending stock, many individual lines are apparent. The ERBS fuels were fractionated by high-performance liquid chromatography and the resulting fractions analyzed by NMR. The species found are identified. C.D.

A83-11491*# Solar Turbines International, San Diego, Calif.

COMBUSTION CHARACTERISTICS OF HYDROGEN-CARBON MONOXIDE BASED GASEOUS FUELS

D. J. WHITE, A. J. KUBASCO, R. T. LECREN (Solar Turbines, Inc., San Diego, CA), and J. J. NOTARDONATO (NASA, Lewis Research Center, Cleveland, OH) IEEE, ASME, and ASCE, Joint Power Generation Conference, Denver, CO, Oct. 17-21, 1982, Paper. 13 p. Research supported by the U.S. Department of Energy

(Contract DEN3-145)

The results of trials with a staged combustor designed to use coal-derived gaseous fuels and reduce the NO(x) emissions from nitrogen-bound fuels to 75 ppm and 37 ppm without bound nitrogen in 15% O₂ are reported. The combustor was outfitted with primary zone regenerative cooling, wherein the air cooling the primary zone was passed into the combustor at 900 F and mixed with the fuel. The increase in the primary air inlet temperature eliminated flashback and autoignition, lowered the levels of CO, unburned hydrocarbons, and smoke, and kept combustion efficiencies to the 99% level. The combustor was also equipped with dual fuel injection to test various combinations of liquid/gas fuel mixtures. Low NO(x) emissions were produced burning both Lurgi and Winkler gases, regardless of the inlet pressure and temperature conditions. Evaluation of methanation of medium energy gases is recommended for providing a fuel with low NO(x) characteristics. M.S.K.

A83-11493*# Westinghouse Electric Corp., Concordville, Pa.

NOX RESULTS FROM TWO COMBUSTORS TESTED ON MEDIUM BTU COAL GAS

T. P. SHERLOCK, D. E. CARL, G. VERMES (Westinghouse Electric Corp., Concordville, PA), J. SCHWAB (Westinghouse Electric Corp., Pittsburgh, PA), and J. J. NOTARDONATO (NASA, Lewis Research Center, Cleveland, OH) IEEE, ASME, and ASCE, Joint Power Generation Conference, Denver, CO, Oct. 17-21, 1982, Paper. 9 p.

The results of tests of two combustor configurations using coal gas from a 25 ton/day fluidized bed coal gasifier are reported. The trials were run with a ceramic-lined, staged rich/lean burner and an integral, all metal multiannular swirl burner (MASB) using a range of temperatures and pressures representative of industrial turbine inlet conditions. A lean mixture was examined at 104, 197, and 254 Btu/Scf, yielding NO(x) emissions of 5, 20, and 70 ppmv, respectively. The MASB was employed only with a gas rated at 220-270 Btu/Scf, producing 80 ppmv NO(x) at rated engine conditions. The results are concluded to be transferable to current machines. Further tests on the effects of gas composition, the scaling of combustors to utility size, and the development of

04 FUELS AND OTHER SOURCES OF ENERGY

improved wall cooling techniques and variable geometry are indicated. M.S.K.

A83-11831* Lunar and Planetary Inst., Houston, Tex.

A GROUNDWATER CONVECTION MODEL FOR RIO GRANDE RIFT GEOTHERMAL RESOURCES

P. MORGAN (Lunar and Planetary Institute, Houston, TX), V. HARDER, P. H. DAGGETT (Texas, University, El Paso, TX), and C. A. SWANBERG (New Mexico State University, Las Cruces, NM) Geothermal Resources Council, Transactions, vol. 5, Oct. 1981, p. 193-196. Research supported by Los Alamos National Laboratory refs (Contract NASW-3389)

It has been proposed that forced convection, driven by normal groundwater flow through the interconnected basins of the Rio Grande rift is the primary source mechanism for the numerous geothermal anomalies along the rift. A test of this concept using an analytical model indicates that significant forced convection must occur in the basins even if permeabilities are as low as 50-200 millidarcies at a depth of 2 km. Where groundwater flow is constricted at the discharge areas of the basins forced convection can locally increase the gradient to a level where free convection also occurs, generating surface heat flow anomalies 5-15 times background. A compilation of groundwater data for the rift basins shows a strong correlation between constrictions in groundwater flow and hot springs and geothermal anomalies, giving strong circumstantial support to the convection model. (Author)

A83-11988

ENVIRONMENTAL MONITORING OF THE ATHABASCA OIL SANDS USING LANDSAT DATA

S. ARONOFF, G. A. ROSS, and W. A. ROSS (Calgary, University, Calgary, Alberta, Canada) Photogrammetria, vol. 38, Oct. 1982, p. 77-86. Research supported by the Alberta Oil Sands Environmental Research Program. refs

The Athabasca Oil Sands have undergone rapid and extensive strip mine development. This activity is expected to resume as the cost of petroleum continues to rise. Sixteen spring, summer, and fall Landsat color composite transparencies at the 1/1 million scale were evaluated for use in environmental monitoring. Roads, cleared areas, and water features were best imaged on the May 1, 1976 color composite. Summer Product 8 imagery (July and August) was most useful for vegetation analysis and also had the best year to year signature consistency. For this reason, summer Product 8 imagery was considered most suitable for environmental monitoring of the oil sands region. Two summer images were overlaid and registered, then changes were classified using a supervised classification algorithm. Change detection analyses of open water, cleared land, and vegetation appeared to be the most valuable applications of Landsat digital data to environmental monitoring of the region. (Author)

A83-12036* Alaska Univ., Fairbanks.

RADAR AND INFRARED REMOTE SENSING OF GEOTHERMAL FEATURES AT PILGRIM SPRINGS, ALASKA

K. G. DEAN, R. B. FORBES, D. L. TURNER, F. D. EATON (Alaska, University, Fairbanks, AK), and K. D. SULLIVAN (NASA, Johnson Space Center, Houston, TX) Remote Sensing of Environment, vol. 12, Nov. 1982, p. 391-405. refs (Contract NAG9-8)

High-altitude radar and thermal imagery collected by the NASA research aircraft WB57F were used to examine the structural setting and distribution of radiant temperatures of geothermal anomalies in the Pilgrim Springs, Alaska area. Like-polarized radar imagery with perpendicular look directions provides the best structural data for lineament analysis, although more than half the mapped lineaments are easily detectable on conventional aerial photography. Radiometer data and imagery from a thermal scanner were used to evaluate radiant surface temperatures, which ranged from 3 to 17 C. The evening imagery, which utilized density-slicing techniques, detected thermal anomalies associated with geothermal heat sources. The study indicates that high-altitude predawn thermal imagery may be able to locate relatively large areas of

hot ground in site-specific studies in the vegetated Alaskan terrain. This imagery will probably not detect gentle lateral gradients. S.C.S.

A83-12954

A DIAGNOSTIC MODEL FOR ESTIMATING WINDS AT POTENTIAL SITES FOR WIND TURBINES

R. M. ENDLICH, F. L. LUDWIG, C. M. BHUMRAKAR (SRI International, Menlo Park, CA), and M. A. ESTOQUE (Miami, University, Miami, FL) Journal of Applied Meteorology, vol. 21, Oct. 1982, p. 1441-1454. refs

A numerical method for estimating the wind power potential of a given site by using terrain heights of the site and of surrounding sites of sources of meteorological data is presented. The technique uses wind and pressure data from four or five National Weather Service stations. An initial estimate is made of winds in the ABL and then adjusted to satisfy the continuity equations, thereby accounting for the influences of terrain and boundary layer height. The model is capable of generating wind speed frequency distributions, monthly variations, diurnal variations, and wind roses, using hourly or three-hourly wind and pressure data. The model was used to generate statistics for DoE candidate wind turbine sites for which on-site data were available, using inputs from off-site areal meteorological stations only. Average annual wind speed deviations of 0.7 m/sec were obtained in comparison with the on-site data, an accuracy level suitable for selecting sites to erect wind measuring equipment to obtain at least one year of on-site data. M.S.K.

A83-14056

AN EXPERIMENTAL STUDY OF FUEL COMBUSTION IN A HIGH-TEMPERATURE AIR COUNTERFLOW [EKSPERIMENTAL'NOE ISSLEDOVANIE GORENIIA TOPLIV VO VSTRECHNOM VYSOKOTEMPERATURNOM POTOKE VOZDUKHA]

IU. M. ANNUSHKIN, A. N. KNIAZEV, and N. S. LOSHENKOVA Fizika Gorenii i Vzryva, vol. 18, Sept.-Oct. 1982, p. 55-58. In Russian. refs

The geometrical characteristics of evaporation zones and flame jets during the combustion of hydrocarbon and boron-hydrocarbon fuels atomized into an oncoming high-temperature air flow are investigated experimentally over a wide range of dynamic pressures and thermal powers of the burner. Possible differences in the combustion mechanisms of the fuels studied are discussed. V.L.

A83-14120

PRIMARY ENERGY: PRESENT STATUS AND FUTURE PERSPECTIVES

K. O. THIELHEIM, (ED.) (Kiel, Neue Universitaet, Kiel, West Germany) Berlin, Springer-Verlag, 1982. 379 p. \$34.

A survey of the base-load energy sources available to humans is presented, starting from the point of view that all energy used is ultimately derived from nuclear processes within the sun. Specific note is made of European energy options, noting the large dependence on imported oil. Detailed exploration of available nuclear fuel resources is carried out, with attention given to fission, fusion, and breeder reactor plants and to the state-of-the-art and technology for each. The problems of nuclear waste disposal are discussed, and long term burial in salt domes is outlined as a satisfactory method of containing the materials for acceptable periods of time. The CO2-greenhouse effect hazards caused by increased usage of coal-derived fuels are considered and precautions to be taken on a global scale to ameliorate the warming effects are recommended. The limitations to hydropower are examined, as are those of tidal power. Solar cells are projected to be produced in GW quantities by the year 2000, while wind-derived electricity is predicted to provide a minimum of 5% of the world energy needs in the future. M.S.K.

04 FUELS AND OTHER SOURCES OF ENERGY

A83-14238#

ENVIRONMENTAL MONITORING OF THE ATHABASCA OIL SANDS REGION

S. ARONOFF (California, University, Berkeley, CA), G. A. ROSS, and W. A. ROSS (Calgary, University, Calgary, Alberta, Canada) In: Canadian Symposium on Remote Sensing, 7th, Winnipeg, Canada, September 8-11, 1981, Proceedings. Ottawa, Canadian Aeronautics and Space Institute, 1982, p. 100-109. Research supported by the Canada Centre for Remote Sensing, Alberta Oil Sands Environmental Research Program, and TES Research and Consulting, Ltd. refs

This study was designed to examine the application of remote sensing to environmental monitoring of the 30,000 square km region under the jurisdiction of the Alberta Oil Sands Environmental Research Program (AOSERP) and to demonstrate appropriate ways to integrate field-acquired and remotely-sensed data. False color infrared aerial photography acquired during the period of maximum foliage development was found to be most valuable for vegetation mapping and the detection of environmental disturbance. Thermal infrared night-time imagery, used with true color aerial photography, was found to be most valuable in the detection of thermal anomalies related to water features and in the analysis of oil sands plant sites. Landsat color composite transparencies were found to be valuable in providing an overview of the major ecological communities in the area, and of the progress of land-clearing operations. Digital analysis of two summer images was done using the computer-based image analysis system at the Canada Centre for Remote Sensing in Ottawa. Change detection analysis of open water, cleared land, and vegetation appeared to be the most valuable application of Landsat digital data to environmental monitoring of the region (Author)

A83-14256#

LANDSAT FOR RESOURCE EVALUATION AND MANAGEMENT IN THE ALBERTA FOOTHILLS

D. B. V. R. CLAASEN and G. A. ROSS (Calgary, University, Calgary, Alberta, Canada) In: Canadian Symposium on Remote Sensing, 7th, Winnipeg, Canada, September 8-11, 1981, Proceedings. Ottawa, Canadian Aeronautics and Space Institute, 1982, p. 247-263. Research supported by Gulf Canada Resources, Inc. refs

The operational role of Landsat imagery in the integrated resource survey process in Alberta has been evaluated noting that oil and gas exploration is a major land use project in the Alberta foothills. Premapping is discussed with reference to imagery selection and enhancement. Reconnaissance field work is described and analysis-mapping procedures are outlined in terms of: (1) the visual analysis of standard color composite images; (2) ecodistrict stratification on enhanced imagery; (3) terrain condition indicators; (4) the Landsat biophysical unit; and (5) biophysical unit mapping. S.C.S

A83-14669#

THE AVAILABILITY OF WIND ENERGY IN HONG KONG

C. T. LEUNG (Chinese University of Hong Kong, Hong Kong) Regional Journal of Energy, Heat and Mass Transfer, vol. 4, Oct. 1982, p. 229-237. refs

A83-15841#

AN EXPERIMENTAL STUDY AND MODELING OF HEAT TRANSFER IN BOILERS OF SMALL AND MEDIUM POWER [ETUDE EXPERIMENTALE ET MODELISATION DES ECHANGES THERMIQUES DANS LES CHAUDIERES DE PETITES ET MOYENNES PUISSANCES]

J.-P. GIRARD Lyon, Institut National des Sciences Appliquees, Docteur-Ingenieur Thesis, 1981, 131 p. In French. refs

An experimental boiler is constructed which allows the measurement of heat transfer between the gas and the boiler, the determination of the temperature in the combustion chamber, and the analysis of the gas in the combustion chamber. The investigations are performed for domestic fuel oil and natural gas, and can be utilized to study the influence of different burner configurations and the operating conditions on the heat transfer

and the yield of the boiler. The experimental results are used to develop a theoretical model for determining the heat flux exchanged in the combustion chamber and the smoke-heat exchanger. The model indicates the importance of the diameter of the boiler in the heat exchange, the lesser importance of the length of the flame and the emissivity of the wall, and the negligible importance of the temperature of the wall. N.B.

A83-16736#

REMOTE SENSING OF COAL-FIRED MHD BY OPTICAL DIAGNOSTIC TECHNIQUES

D. L. MURPHREE, R. L. COOK, W. S. SHEPARD, L. E. BAUMAN, J. D. GASSAWAY, R. E. STICKEL, R. O. DAUBACH, J. C. LUTHE, M. F. ALI, and D. V. SRIKANTIAH (Mississippi State University, Mississippi State, MS) American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 21st, Reno, NV, Jan. 10-13, 1983, 13 p. refs (Contract DE-AC02-80ET-15601) (AIAA PAPER 83-0469)

Advanced optical diagnostic instrumentation systems are being developed at Mississippi State University for the U.S. Department of Energy's magnetohydrodynamic program and other fossil energy technologies for the measurement of combustion temperature, slag wall temperature, gas velocity and turbulence profiles, nitric oxide concentration and particle size distribution. This paper describes development of a differential optical absorption technique for the measurement of nitric oxide concentrations, the laser Doppler velocimeter system and recent test stand measurements, and recent time-resolved gas temperature measurements by the sodium line reversal technique. A hybrid particle size distribution system applicable to the harsh environment of an MHD flow in the MSU combustion test stand will also be discussed. (Author)

A83-17849

ESTIMATION OF WAVE POWER POTENTIAL ALONG THE INDIAN COASTLINE

T. V. S. N. RAO and V. SUNDAR (Indian Institute of Technology, Madras, India) Energy (UK), vol. 7, Oct. 1982, p. 839-845.

An assessment of the wave power potential along the Indian coastline has been made for different seasons. The locations off Bombay on the west coast and off Visakhapatnam on the east coast have the greatest wave power potentials. The occurrence of wave heights and periods are presented graphically. Monthly wave power variations for locations along the Indian coastline are also reported. (Author)

A83-18456

AN ASSESSMENT OF WIND ENERGY RESOURCE FOR NORTHWESTERN CALIFORNIA

R. E. RUFF and R. M. ENDLICH (SRI International, Menlo Park, CA) In: Heat Transfer and Fluid Mechanics Institute, Meeting, 28th, Sacramento, CA, June 28, 29, 1982, Proceedings. Sacramento, CA, CSUS University Publications, 1982, p. 149-164. Research supported by the California Energy Commission refs

The methodology employed to choose prospective wind farm sites, develop a mesoscale numerical model of the wind regime, and select sites for anemometer emplacement in northwestern California is described. The study began with elimination of prospects governed by legal, aesthetic, and accessibility impediments. Twenty candidate sites, each with 300-1000 acres of land, were found and five were eliminated for environmental reasons. NWS data and other short-term wind data were used, together with topographic maps and U-2 aerial photography to develop a list of ranked sites. A computer simulation was employed with a parameter which accounted for large terrain height variations. A 5-10 km mesh was used in the horizontal and 100 m in the vertical, and a boundary layer of thickness of 800 m was assumed. Contact anemometers and wind vanes, microprocessor controlled and battery powered for a month, were chosen for instrumentation. One year monitoring at 10 m at 15 candidate sites was scheduled to begin in Sept. 1981. D.H.K.

04 FUELS AND OTHER SOURCES OF ENERGY

A83-18560

BIOMASS ENERGY

Solar Energy, vol. 30, no. 1, 1983, p. 1-31. refs

The present analysis of the development status of biomass energy systems has been conducted by the Energy Research Advisory Board with a view to the prospects for biomass energy use by the year 2000, taking into account the research funds and scientific manpower that should be allocated to biomass production and use investigations. It is projected that the net energy from biomass use could increase approximately four-fold from the current level of 1.1-1.3 Q net by the year 2000, although existing estimates of biomass availability have not included all possible constraints imposed by agriculture, forestry, technology, economics and the environment. Biomass energy potentials are primarily constrained by limits on agricultural and forest production, and by the need to maintain a productive and high quality environment. It is noted that food and other consumer goods also compete for available biomass resources. O.C.

N83-10131 State Univ. of New York, Buffalo.

ROLE OF TIN CATALYSTS IN THE HYDROLIQUEFACTION OF COAL Ph.D. Thesis

M. C. TSAI 1981 192 p refs

Avail. Univ. Microfilms Order No. DA8204129

The role of tin catalysts was studied for the hydroliquefaction of coal in batch autoclave experiments with tetralin and tin catalysts. Two competing reactions were found to play important roles: hydrogen transfer from tetralin to coal, and dehydrogenation/hydrogenation in the reaction Tetralin = Naphthalene + 2H₂. Experimental results indicate that (1) the addition of either SnCl₂ or SnS + NH₄Cl strongly catalyzes the production of oil during coal hydro faction; (2) the production of tetralin and heptane soluble 'oils' depends mainly on the catalyst type; and (3) the free gas volume in the reactors at reaction conditions is an important parameter, since it influences the autogenous pressure and thus the mode of action of catalysts.

Dissert. Abstr.

N83-10132 Utah Univ., Salt Lake City.

CATALYTIC HYDRODEOXYGENATION OF COAL-DERIVED LIQUIDS AND RELATED OXYGEN-CONTAINING COMPOUNDS Ph.D. Thesis

G. HAIDER 1981 252 p

Avail: Univ. Microfilms Order No. DA8203386

Systematic catalytic hydrodeoxygenation (HDO) studies of coal derived liquids (CDL) and related model oxygen containing compounds are reported. The studies were performed in specially adapted autoclave systems, using sulfided Co-Mo/Al₂O₃ and Ni-W/Al₂O₃ as catalysts. Starting feedstocks are described. Changes in product composition as a function of experimental variables (reaction temperature, hydrogen pressure, reaction time, and catalyst type) were investigated and mechanistic aspects of the HDO reactions elucidated. HDO of the SRC-II distillate was studied as a function of reaction temperature and catalyst by means of elemental, infrared and C(13)NMR analyses of hydrotreated products. The data were used for better understanding of the complex HDO reactions involved both in primary liquefaction processes as well as in catalytic CDL upgrading by correlating the molecular level data obtained in the study of model O containing compounds with results of the investigation of the SRC II distillate. Dissert. Abstr.

N83-10140# Yale Univ., New Haven, Conn School of Medicine.

DEVELOPMENT OF NEWER METHODS FOR THE ISOLATION AND IDENTIFICATION OF CERTAIN COMPONENTS FOUND IN COMPLEX MIXTURES DERIVED FROM ENERGY SOURCES AND THE DETERMINATION OF THEIR TOXICITY VIA BIOASSAY SYSTEMS

S. R. LIPSKY 22 Jun. 1982 63 p refs

(Contract DE-AC02-76EV-02958)

(DE82-019043; DOE/EV-02958/6) Avail: NTIS HC A04/MF

A01

By utilizing a multidimensional gas chromatographic-mass spectrometer system, individual chemical components from complex mixtures of organic compounds derived from certain energy sources were isolated and trapped out into segments of blank fused silica glass capillary tubing. These substances were then introduced into a very sensitive bioassay flow system. Here, the toxicity of these materials present in the 1 to 50 nanogram range was assessed. Thus far, from the analysis of over 70 different chemicals determined in this manner and compared with the results obtained with the conventional assay system, an excellent correlation was noted. DOE

N83-10142# Technische Univ., Berlin (West Germany).

INVESTIGATION OF EXTRACTS BY FLUIDIZED BED EXTRACTION Final Report, Aug. 1981

H. MEIERZUKOECKER and U. HELLWIG Bonn

Bundesministerium fuer Forschung und Technologie May 1982

83 p refs In GERMAN; ENGLISH summary Sponsored by

Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-068; ISSN-0340-7608) Avail: NTIS HC A05/MF

A01, Fachinformationszentrum, Karlsruhe, West Germany DM

17,50

The indirect hydrogenation of coal extracts process in which in a first step the coal is mixed with a hydrogenating solvent and where in a second step after separation of ashes and coal residues the extract is hydrogenated, was studied. Main drawbacks are the extraction process, the separation between extracts and residues, and the instability of the extracts, leading to a rapid deterioration of the ability to be hydrogenated. The hydrogenation ability of extracts obtained by a fluidized bed process, the use of a cheap solvent derived if possible from the hydrogenating process itself, the adaptability of the process to the use of low grade coal with, for instance, high ash content or of brown coal, and the possibility to transpose the technique from the discontinuous working laboratory installation to a semi-continuous pilot plant were investigated. Author (ESA)

N83-10143# Bergbau-Forschung G.m.b.H., Essen (West Germany). Abt. Physikalische Chemie.

COAL GASIFICATION OF STEAM-SOLUTED CATALYST Final Report, Dec. 1980

A. SULIMMA and K. H. VANHEEK Bonn Bundesministerium

fuer Forschung und Technologie Jun. 1982 50 p refs In

GERMAN; ENGLISH summary Sponsored by Bundesministerium

fuer Forschung und Technologie

(BMFT-FB-T-82-073; ISSN-0340-7608) Avail: NTIS HC A03/MF

A01; Fachinformationszentrum, Karlsruhe, West Germany DM

10,50

It was proven that alkaline catalysts such as K₂CO₃ and KOH, were the most effective catalysts in the gasification process of coal. The way of introducing the catalyst, e.g., by dry mixing with the coal, by impregnating coal with water solutions of the catalyst, or by bounding the catalyst chemically to the coal, were proven to be of prime importance. A method of charging the catalyst under the form of high pressure steam solutions in a fluidized bed processor was investigated. It is shown that this method is efficient, that the acceleration of the gasification process is dependent on the amount of catalyst present in the reactor, as far as the concentration of catalyst exceeds a lower level due to reactions between the catalyst and the coal minerals, and that the catalyst stays in the fluidized bed up to a high degree of gasification. This finding has significance for the allothermic steam gasification of

04 FUELS AND OTHER SOURCES OF ENERGY

the PNP project where the coal loaded with catalyst migrates through the horizontal reactor. The reaction rates are increased by a factor of 10 or more even at low initial catalyst concentrations. Author (ESA)

N83-10145# Technische Hochschule, Aachen (West Germany) Inst. fuer Aufbereitung.
DESULFURIZATION OF COAL BY MEANS OF THE BATAc-JIG Final Report, Mar. 1981

W. SCHOLLMEIER and C. WALENZIK Bonn Bundesministerium fuer Forschung und Technologie Jul. 1982 164 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-T-82-100; ISSN-0340-7608) Avail: NTIS HC A08/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 34,50

The different separation possibilities were studied and it was shown that the jig process is very favorable. Tests with coal in the grain size range from ten to zero mm which permitted to find the best adjustment of the Batac-jig are described. Further investigations on coal in the grain size from two to zero mm were also carried out. The investigation shows that the Batac-jig is suitable for de-ash and desulfurizing of the examined type of coal containing 50 % by weight of finest grains, with a good sharpness of separation. Author (ESA)

N83-10146# Kraftwerk Union A.G. Reaktortechnik, Erlangen (West Germany). Hauptbereich Vertrieb und Kraftwerkstechnik.
HARD COAL GASIFICATION USING CATALYSTS DISSOLVED IN STEAM Final Report, Jan. 1981

D. REINHARDT Bonn Bundesministerium fuer Forschung und Technologie Jun. 1982 181 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-T-82-107; ISSN-0340-7608) Avail: NTIS HC A09/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 34,50

Process energy, resulting from a high temperature reactor, is considered. Use of nuclear energy for gasification of hard coal is not economical. A method to overcome this difficulty, is to increase gasification rate by adding a catalyst. The catalyst is introduced by dissolving it in the gasifying medium. Poor solubility of the catalytically active salts in steam at pressures below 100 bars, is overcome by a supersaturating technique. For very diluted catalyst concentrations, this process appears to be superior compared to concurrent methods of catalyst addition. Moreover, catalyst feed during the course of the reaction might be an advantage of the process. Author (ESA)

N83-10151# McNeese State Univ., Lake Charles, La
STANDARDIZATION OF SAMPLING AND ANALYSIS OF GEOPRESSURED FLUIDS. PART 2: MONITORING OF GEOPRESSURED WELLS Final Report, 1 May 1980 - 31 Jul. 1981

B. E. HANKINS and O. C. KARKALITS Aug. 1981 91 p refs (Contract GRI-5080-321-0301) Avail: NTIS HC A05/MF A01 CSCL 07D

Chemical analyses of geopressured fluids (brine and gas) obtained from seven wells are reported. The analyses were made by the on site chemical subcontractor and collaborating research laboratories. McNeese State University served as quality control contractor for GRI. McNeese sent aliquots of the samples (referred to as round robin samples) to the collaborators for quality control check analyses. The data have been collated and subjected to a statistical study. Based on these data, recommendations have been made regarding future quality control measures and possible revisions of the Standard Procedures Manual. GRA

N83-10154# Department of Agriculture, Washington, D.C. Economic Research Service

ESTIMATED CAPACITY OF US ETHANOL PLANTS

M. GILL and A. D. DARGAN Feb. 1982 38 p refs (PB82-203647; ACESS-820210) Avail: NTIS HC A03/MF A01 CSCL 07A

Data on U.S. alcohol fuel production capacity for 1980 to 83 is given. The major feedstock used is corn because of its availability and the technical ease of conversion to alcohol by means of the well-known fermentation process. The Corn Belt is currently the leading alcohol fuel production region. The estimates of likely, optimistic, and highly optimistic capacity by the end of 1983 are 1.5, 1.7, and 2 billion gallons, respectively. These estimates indicate that the national alcohol fuel production goal of 60,000 barrels per day (920 million gallons per year) by the end of 1982 will not be achieved. Author (GRA)

N83-10156# Battelle Pacific Northwest Labs, Richland, Wash.
KINETICS AND CATALYSIS OF PRODUCING SYNTHETIC GASES FROM BIOMASS Annual Report, 7 Dec. 1980 - 6 Dec. 1981

L. J. SEALOCK, JR., D. C. ELLIOTT, R. T. HALLEN, R. D. BARROWS, and S. L. WEBER Dec. 1981 175 p refs (Contract GRI-5014-361-0242) (PB82-214347; GRI-80/0116) Avail: NTIS HC A08/MF A01 CSCL 07D

The kinetics, reaction sequences and pathways involved in pyrolysis and catalytic steam gasification of wood and wood components are investigated. A one liter stirred autoclave was used to study gasification in a low temperature regime (100 C to 450 C). The autoclave was successfully modified to allow remote sampling of the liquid and gaseous phases present in the reaction environment. A two inch diameter batch reactor is being used to study gasification at higher temperatures (550 C to 850 C). Kinetic studies of the gasification reactions relative to cellulose, holocellulose, lignin, and Douglas air gasification were completed. Reaction rate constant and activation energies were determined for catalyzed and uncatalyzed cases. The formation of specific compounds during gasification in the presence and absence of catalysts was investigated in both reactor systems. Results of the low and high temperature experiments demonstrated dramatic differences in the kinetics and gas composition as a function of the various catalyst cases and components tested. GRA

N83-10160# Colorado School of Mines, Golden.
LIQUID-VAPOR EQUILIBRIUM FOR TERNARY NATURAL GAS SYSTEM Annual Report, Oct. 1980 - Oct. 1981

A. J. KIDNAY and E. D. SLOAN Sep. 1981 61 p refs (Contract GRI-5014-363-0198; NSF ENG-79-04440) (PB82-227679; GRI-82/0008) Avail: NTIS HC A04/MF A01 CSCL 07D

Vapor liquid equilibrium (VLE) data were measured for the nitrogen + carbon dioxide binary system at 220 and 240 K and for the methane + carbon dioxide system at 219.26, 240 and 270 K. Ternary VLE measurements were made for the system N + CH₄ + CO₂ at 220 K and 6.080, 9.119 and 12.159 MPa, 233.15 K at 8.106 MPa, and 240 K at 7.093, 9.119 and 12.159 MPa. The multicomponent reference corresponding states method proposed by Teja and Rice was applied to VLE calculations and the results of this method for the binary and ternary systems were compared with the results of the Lee-Kesler corresponding states correlation and the Peng-Robinson equation of state. The multicomponent and Lee-Kesler methods give comparable results for the constituent binaries of the N₂ + CH₄ + CO₂ system. However, the multicomponent model predictions for the ternary system were superior to the predictions of the Lee-Kesler method. The Peng-Robinson equation of state was found to be better than both corresponding states methods for both binary and ternary system VLE predictions. None of the methods produced good representation near the critical points of the binary and ternary systems. Author

04 FUELS AND OTHER SOURCES OF ENERGY

N83-10206 City Univ. of New York, N. Y.
THE HEAT CAPACITY OF COAL CHARS Ph.D. Thesis
 W. Y. WANG 1982 168 p

Avail: Univ. Microfilms Order No. DA820333

During pyrolysis, the solid phase of coal is transformed into a microcrystalline structure with some extent of graphite-like orderliness. It is of interest to determine the thermodynamics of this structure which is believed to be process and coal origin dependent. This study was undertaken to elucidate the effect of the various factors on the heat capacity of coal chars. In order to assess the effect of coal rank and impurity content, several coals were obtained from the Pennsylvania State University Coal Bank. These selected starting materials were , a North Dakota lignite, an Illinois No.6 bituminous and a Virginia coking coal. The carbon content of these coals ranged from 59 to 75 wt% (mineral matter included). Half of each of the received coal sample was demineralized using a standard procedure. Chars were prepared from the received and demineralized coals by pyrolysis. The heat capacity of these samples increases, in general, with increasing temperature and moisture content, and its behavior and order of magnitude are very similar to pure carbons when compared on a moisture free basis. The mineral matter content also affects the measured heat capacity. The thermally transformed mineral matter (ash) contributes differently to the total heat capacity than the mineral matter in its original form. The moisture-containing coal seems to have higher heat capacity than expected by simple additive principle and shows a broad phase transition around ice point.

Dissert. Abstr.

N83-10207* Midwest Research Inst., Kansas City, Mo.
EVALUATION OF METHODS FOR RAPID DETERMINATION OF FREEZING POINT OF AVIATION FUELS Final Report

B. MATHIPRAKASAM Sep. 1982 105 p refs

(Contract NAS3-22543)

(NASA-CR-167981; NAS 1.26:167981; MRI-7014-G) Avail: NTIS HC A06/MF A01 CSCL 21D

Methods for identification of the more promising concepts for the development of a portable instrument to rapidly determine the freezing point of aviation fuels are described. The evaluation process consisted of: (1) collection of information on techniques previously used for the determination of the freezing point, (2) screening and selection of these techniques for further evaluation of their suitability in a portable unit for rapid measurement, and (3) an extensive experimental evaluation of the selected techniques and a final selection of the most promising technique. Test apparatuses employing differential thermal analysis and the change in optical transparency during phase change were evaluated and tested. A technique similar to differential thermal analysis using no reference fuel was investigated. In this method, the freezing point was obtained by digitizing the data and locating the point of inflection. Results obtained using this technique compare well with those obtained elsewhere using different techniques. A conceptual design of a portable instrument incorporating this technique is presented.

J.D.

N83-10208* National Aeronautics and Space Administration.
 Lewis Research Center, Cleveland, Ohio.

LITERATURE SURVEY OF PROPERTIES OF SYN FUELS DERIVED FROM COAL Final Report

F. FLORES Aug. 1982 187 p refs Presented at ASTM Symp. on alternate fuels and future fuels specifications for stationary gas turbine applications, Phoenix, Ariz., 9-10 Dec. 1981 (Contract DE-A101-77ET-10350)

(NASA-TM-82739, E-1052; DOE/NASA/10350-30; NAS 1.15:82739) Avail: NTIS HC A09/MF A01 CSCL 21D

A literature survey of the properties of synfuels for ground-based turbine applications is presented. The four major concepts for converting coal into liquid fuels (solvent extraction, catalytic liquefaction, pyrolysis, and indirect liquefaction), and the most important concepts for coal gasification (fixed bed, fluidized bed, entrained flow, and underground gasification) are described. Upgrading processes for coal derived liquid fuels are also described. Data presented for liquid fuels derived from various

processes, including H-coal, synthoil, solvent refined coal, COED, donor solvent, zinc chloride hydrocracking, co-steam, and flash pyrolysis. Typical composition, and property data is also presented for low and medium-BTU gases derived from the various coal gasification processes.

M.G.

N83-10210# Ashland Petroleum Co., Ky. Research and Development Dept.

REFINING OF MILITARY JET FUELS FROM SHALE OIL. PART 1. PRELIMINARY PROCESS DESIGN, ECONOMIC AND YIELD OPTIMIZATION, AND COMPUTER MODELING Interim Technical Report, Feb. - Jun. 1979

C. JOHNSON, H. F. MOORE, and W. A. SUTTON Wright-Patterson

AFB, Ohio AFWAL Apr. 1982 187 p refs

(Contract F33615-78-C-2080; AF PROJ. 3048)

(AD-A117511, AFWAL-TR-81-2056-PT-1) Avail: NTIS HC

A09/MF A01 CSCL 21D

Phase I work performed was directed at the preparation of an overall processing method based on the application of current refining techniques and an extraction process for the removal of nitrogen from shale oil. This preliminary process analysis was aimed at demonstrating technical as well as economic feasibility. This phase explored two overall processing methods, one providing JP-8 type aviation turbine fuel, the other method providing JP-4 type aviation turbine fuel. It was concluded that this process design offers the potential of producing high yields of aviation turbine fuels from shale oil with product costs competitive with or lower than comparable product slates from other shale refineries. Processing steps are provided that will minimize hydrogen consumption, provide a thermal efficiency greater than 70 percent, and produce residual fuel in quantities less than 10 percent of the total product slate.

Author (GRA)

N83-10211# Suntech, Inc., Marcus Hook, Pa.

AN EXPLORATORY RESEARCH AND DEVELOPMENT PROGRAM LEADING TO SPECIFICATIONS FOR AVIATION TURBINE FUEL FROM WHOLE CRUDE SHALE OIL. PART 4: PRODUCTION OF SAMPLES OF MILITARY FUELS FROM RAW SHALE OILS Interim Report, 1 Apr. 1980 - 30 Nov. 1981

H. E. REIF, J. P. SCHWEDOCK, and A. SCHNEIDER Wright-Patterson AFB, Ohio AFWAL Feb. 1982 73 p Presented at the 3rd Jet Fuel From Shale Oil Technol. Rev., Miamisburg, Ohio, 17-18 Nov. 1981

(Contract F33615-78-C-2024; AF PROJ. 2480)

(AD-A117526; AFWAL-TR-81-2087-PT-4) Avail: NTIS HC

A04/MF A01 CSCL 21E

A total of 475 gallons of specification aviation turbine fuels (JP-4, JP-5 and JP-8) were prepared from Occidental Shale Oil based on Sun Tech's upgrading concept. Processing consists of six steps: (1) hydrotreating the whole shale oil to partially reduce total nitrogen content to minimize hydrogen consumption; (2) distilling the hydrotreated product into appropriate fractions for additional processing; (3) rehydrotreating the light distillate fraction to meet product specifications; (4) treating the wide boiling gas oil fraction with anhydrous hydrogen chloride (HCl) which yields a low nitrogen content raffinate and a high nitrogen content extract phase; (5) thermally decomposing the extract to recover anhydrous HCl and a nitrogen-rich extract, which is used for generating hydrogen by partial oxidation; and (6) hydrocracking the raffinate phase to maximize aviation turbine fuel yield. Five 5-gallon samples of specification military fuels were produced from Paraho shale oil (JP-4, JP-5, JP-8, DF-2 and DF Marine) using a modified process. Processing consists of severely hydrotreating raw shale oil followed by fractionation and finally hydrocracking the wide boiling gas oil fraction to produce the desired product slate.

GRA

04 FUELS AND OTHER SOURCES OF ENERGY

N83-10212# JAYCOR, San Diego, Calif.

COMPUTER MODELING OF MIXING AND AGGLOMERATION IN COAL-CONVERSION REACTORS. VOLUME 1: MODEL FORMULATION Final Report, 15 Sep. 1978 - 28 Feb. 1982

R. K. C. CHAN, M. J. CHIOU, D. E. DIETRICH, D. R. DION, H. H. KLEIN, D. H. LAIRD, H. B. LEVINE, C. A. MEISTER, M. F. SCHARFF, and B. SRINIVAS Feb. 1982 125 p refs 2 Vol. (Contract DE-AC21-78ET-10329)

(DE82-014836; DOE/ET-10329/1211-VOL-1;

J510-82-007A/2112-VOL-1) Avail: NTIS HC A06/MF A01

The FLAG code consists of the following major modules: gas flow (including gas turbulence), gas phase chemistry, particle dynamics and energetics (including particle dispersion), particle chemistry (including devolatilization and heterogeneous reactions), particle collisions, agglomeration, and heat transfer (conduction and radiation). These physical chemical modules are embodied in computer subprograms. The distinction between a module and a subprogram is that the former is a conceptual division of the significant phenomena, whereas the latter is based on the ease of manipulation within the structure of the computer code. The basic solution procedure is a step by step integration of all the governing equations with respect to time, using a semiimplicit, second order accurate, finite difference scheme. In this procedure, the field variables, such as pressure, temperature, gas species concentration, velocity, etc. are evaluated at a finite set of spatial locations inside the reactor, as the time goes through a sequence of small, but finite increments. DOE

N83-10213# Cornell Univ., Ithaca, N. Y. Center for Radiophysics and Space Research.

STUDIES RELATED TO THE DEEP EARTH GAS Annual Report, Jan. - Dec. 1981

T. GOLD, E. BILSON, and S. SOTER Mar. 1982 65 p refs (Contract GRI-5081-360-0453)

(PB82-227653, GRI-81/0050) Avail: NTIS HC A04/MF A01 CSDL 21D

The origin of terrestrial hydrocarbons, principally of methane and petroleum was elucidated. Methane was successfully reacted with petroleum hydrocarbons. This reaction does occur at a measurable rate in the presence of natural clay catalysts at temperatures and pressures existing in the geological setting of petroleum formation. Upward migrating methane participates in petroleum formation. Evidence concerning regional patterns of hydrocarbon deposits, trace element content, the geologic setting of the deposits and the chemical and physical processes in the upper mantle and the crust, shows that methane from deep sources penetrated the crust in large quantities, and that this has contributed to the formation of much of the world's natural fuel supplies. GRA

N83-10214*# National Academy of Sciences - National Research Council, Washington, D. C. Committee on Alternative Aviation Turbine Fuels, Aeronautics and Space Engineering Board.

AVIATION TURBINE FUELS: AN ASSESSMENT OF ALTERNATIVES Final Report

Apr. 1982 82 p refs

(Contract NASW-3522)

(NASA-CR-169395; NAS 1.26:169395; PB82-213737) Avail: NTIS HC A05/MF A01 CSDL 21D

The general outlook for aviation turbine fuels, the effect that broadening permissible aviation turbine fuel properties could have on the overall availability of such fuels, the fuel properties most likely to be affected by use of lower grade petroleum crudes, and the research and technology required to ensure that aviation turbine fuels and engines can function satisfactorily with fuels having a range of fuel properties differing from those of current specification fuel are assessed. Views of industry representatives on alternative aviation turbine fuels are presented GRA

N83-10426# Engineering Development Establishment, Manbyrnong (Australia).

INVESTIGATION OF THE PERFORMANCE OF A FORD 4.1 L 6 CYLINDER SI ENGINE OPERATING ON METHANOL ISO-BUTANOL GASOLINE FUEL BLENDS

D. J. AYERS 1982 24 p refs

(AD-A117746; EDE-10/82; AR002777) Avail: NTIS HC A02/MF A01 CSDL 21D

A laboratory investigation into the relative performance of a Ford Falcon 4.1 L 6 cylinder in line engine when operated on both super grade gasoline and blends of non leaded gasoline, methanol and iso butanol showed that the engine operated satisfactorily on fuel blends containing up to 30% total alcohol. For the blends thermal efficiency of the engine for most conditions was improved but some torque loss was experienced under full throttle conditions especially at lower engine speeds. This loss increased with increasing proportion of alcohols in the fuel.

Author (GRA)

N83-10430# Wayne State Univ., Detroit, Mich. Center for Automotive Research.

SENSITIVITIES OF INTERNAL COMBUSTION AUTOMOTIVE ENGINES TO VARIATIONS IN FUEL PROPERTIES Final Report, Apr. - Dec. 1981

N. A. HENEIN Washington, D.C. DOT Feb. 1982 236 p refs

(Contract DTRS-57-80-P-80733)

(PB82-194961; DOT-TSC-RSPA-81-13) Avail: NTIS HC A11/MF A01 CSDL 21E

The sensitivity of automotive gasoline and diesel engines to variations in fuel properties was assessed. The variables studied include H/C ratio, distillation range, aromatic content, ignition quality as determined by the octane number, and the autoignition quality as determined by the cetane number. The sensitivity of the engine is 'measured' against its power output, fuel economy, emissions, and degradation of lubricants. The sensitivity to the use of alternate fuels such as neat fuels or fuel extenders is discussed. The alternate fuels studied include shale oil derivatives, coal liquefaction derivatives, and alcohols. The impact of using emergency fuels in automotive gasoline and diesel engines is discussed GRA

N83-10479# Institut fuer Erdoelforschung, Hanover (West Germany).

CRITICAL RELATIONSHIPS FOR DISPLACEMENT PROCESSES IN OIL FIELDS Final Report, Oct. 1981

S. TUNC Bonn Bundesministerium fuer Forschung und Technologie Jun. 1982 43 p refs In GERMAN, ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-093, ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 9

The correlation of various essentially defined parameters for displacement processes was examined in order to find the critical values describing oil mobility with the aim of optimal oil recovery. The relationships between the permeabilities and the mobility ratios with displacement efficiency were determined. The three most important dimensionless characteristic values were discussed with the help of experimental results. It is discovered that with suitable co-surfactants stable microemulsions can be formed between the oil and the water phases. The microemulsion contains almost all the surfactants used. Due to the fact that this middle phase emulsion does not have high viscosity and behaves as a Newton fluid, a very low pressure gradient is encountered during the displacement process so that an optimal displacement efficiency for the system can be achieved. Author (ESA)

04 FUELS AND OTHER SOURCES OF ENERGY

N83-10495# British Library Lending Div., Boston Spa (England)
EXPERIMENTS ON THE ADAM 1 PLANT FOR THE OPTIMISATION OF METHANIZATION PROCESS IN THE LONG DISTANCE NUCLEAR ENERGY TRANSMISSION SYSTEM TEST RUN PERFORMED IN THE SPRING OF 1980

B. HOEHLEIN, R. MENZER, M. VORWERK, and A. SKOV 15 Sep. 1982 44 p refs Transl. into ENGLISH of rept. from Kernforschungsanlage, Julich, West Germany, Oct. 1980 38 p (BLL-T5869/BG/MRS14614/82) Avail: British Library Lending Div., Boston Spa, Engl.

Various problems of the methanation in gas synthesis to improve the long distance nuclear energy system were investigated. Important results were obtained regarding high temperature methanation of up to 700 C, to a closed steam reforming methanation circuit, and to the operation of a recycle ejector in ADAM 1 which limits the outlet temperature of the first reactor.

E.A.K

N83-10497 Columbia Univ., New York.
MEMBRANE CONTROLLED ANAEROBIC DIGESTION Ph.D. Thesis

D. R. OMSTEAD 1981 155 p
Avail: Univ. Microfilms Order No. DA8204530

In response to general shortages of energy, examination of the anaerobic digestion process as a potential source of a combustible, methane-rich fuel has intensified in recent years. It has been suggested that organic intermediates (such as fatty acids), produced during digestion, might also be recovered for use as chemical feedstocks. This investigation has been concerned with combining ultrafiltration separation techniques with anaerobic digestion for the development of a process in which the total production of acetic acid (the most valuable intermediate in anaerobic digestion) and methane are optimized. Enrichment cultures, able to utilize glucose as a sole carbon source, were adapted from sewage digesting cultures using conventional techniques. An ultrafiltration system was constructed and coupled to an anaerobic digester culture vessel which contained the glucose enrichment. The membrane controlled anaerobic digester appears to show promise as a means of producing high rates of both methane gas and acetic acid

Dissert. Abstr.

N83-10503*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

RESOURCE TARGETS FOR ADVANCED UNDERGROUND COAL EXTRACTION SYSTEMS

J. H. HOAG, D. W. WHIPPLE, H. HABIB-AGAH, and M. L. LAVIN 1 Aug. 1982 128 p refs
(Contract NAS7-100; DE-AI01-76ET-12548)

(NASA-CR-169429; JPL-PUB-82-15; NAS 1 26:169429; DOE/ET-12548/14) Avail: NTIS HC A07/MF A01 CSCL 081

Resource targets appropriate for federal sponsorship of research and development of advanced underground coal mining systems are identified. A comprehensive examination of conventional and unconventional coals with particular attention to exceptionally thin and thick seams, steeply dipping beds, and multiple seam geometry was made. The results indicate that the resource of primary importance is flat lying bituminous coal of moderate thickness, under moderate cover, and located within the lower 48 states. Resources of secondary importance are the flat lying multiple seams and thin seams (especially those in Appalachia). Steeply dipping coals, abandoned pillars, and exceptionally thick western coals may be important in some regions of subregions, but the limited tonnage available places them in a position of tertiary importance.

Author

N83-10556*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio

COMBUSTION OF COAL GAS FUELS IN A STAGED COMBUSTOR

T. J. ROSFJORD, J. B. MCVEY, R. A. SEDERQUIST, and D. F. SCHULTZ 1982 14 p refs Presented at the Joint Power Conf., Denver, 17-21 Oct. 1982 Prepared in cooperation with United Technologies Research Center, East Hartford, Conn. and United Technologies Corp., South Windsor, Conn.

(Contract DEN3-149; DE-AI01-77ET-13111)
(NASA-TM-82987; DOE/NASA/13111-12; E-1419; NAS 1.15:82987) Avail: NTIS HC A02/MF A01 CSCL 10B

Gaseous fuels produced from coal resources generally have heating values much lower than natural gas; the low heating value could result in unstable or inefficient combustion. Coal gas fuels may contain ammonia which if oxidized in an uncontrolled manner could result in unacceptable nitrogen oxide exhaust emission levels. Previous investigations indicate that staged, rich-lean combustion represents a desirable approach to achieve stable, efficient, low nitrogen oxide emission operation for coal-derived liquid fuels containing up to 0.8-wt pct nitrogen. An experimental program was conducted to determine whether this fuel tolerance can be extended to include coal-derived gaseous fuels. The results of tests with three nitrogen-free fuels having heating values of 100, 250, and 350 Btu/scf and a 250 Btu/scf heating value doped to contain 0.7 pct ammonia are presented.

Author

N83-10557*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio

EVALUATION OF ADVANCED COMBUSTION CONCEPTS FOR DRY NO SUB X SUPPRESSION WITH COAL-DERIVED, GASEOUS FUELS

K. W. BEEBE (GE, Schenectady, N.Y.), R. A. SYMONDS (GE, Schenectady, N.Y.), and J. J. NOTARDONATO 1982 15 p refs Presented at the Joint Power Conf., Denver, 17-21 Oct. 1982

(Contract DE-AI01-77ET-13111)
(NASA-TM-82985; DOE/NASA/13111-11; E-1417; NAS 1.15:82985) Avail: NTIS HC A02/MF A01 CSCL 10B

The emissions performance of a rich lean combustor (developed for liquid fuels) was determined for combustion of simulated coal gases ranging in heating value from 167 to 244 Btu/scf (7.0 to 10.3 MJ/NCM). The 244 Btu/scf gas is typical of the product gas from an oxygen blown gasifier, while the 167 Btu/scf gas is similar to that from an air blown gasifier. NOx performance of the rich lean combustor did not meet program goals with the 244 Btu/scf gas because of high thermal NOx, similar to levels expected from conventional lean burning combustors. The NOx emissions are attributed to inadequate fuel air mixing in the rich stage resulting from the design of the large central fuel nozzle delivering 71% of the total gas flow. NOx yield from ammonia injected into the fuel gas decreased rapidly with increasing ammonia level, and is projected to be less than 10% at NH3 levels of 0.5% or higher. NOx generation from NH3 is significant at ammonia concentrations significantly less than 0.5%. These levels may occur depending on fuel gas cleanup system design. CO emissions, combustion efficiency, smoke and other operational performance parameters were satisfactory. A test was completed with a catalytic combustor concept with petroleum distillate fuel. Reactor stage NOx emissions were low (1.4g NOx/kg fuel). CO emissions and combustion efficiency were satisfactory. Airflow split instabilities occurred which eventually led to test termination.

S.L.

04 FUELS AND OTHER SOURCES OF ENERGY

N83-10559*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
MULTIFUEL EVALUATION OF RICH/QUENCH/LEAN COMBUSTOR

J. J. NOTARDONATO, A. S. NOVICK (Detroit Diesel Allison), and D. L. TROTH (Detroit Diesel Allison) 1982 12 p refs Presented at the Joint Power Conf., Denver, 17-21 October 1982

(Contract DE-AI01-77ET-13111)

(NASA-TM-82986; E-1418; DOE/NASA/13111-10; NAS 1.15:82986) Avail: NTIS HC A02/MF A01 CSCL 21B

The fuel flexible combustor technology was developed for application to the Model 570-K industrial gas turbine engine. The technology, to achieve emission goals, emphasizes dry NOx reduction methods. Due to the high levels of fuel-bound nitrogen (FBN), control of NOx can be effected through a staged combustor with a rich initial combustion zone. A rich/quench/lean variable geometry combustor utilizes the technology presented to achieve low NOx from alternate fuels containing FBN. The results focus on emissions and durability for multifuel operation S.L.

N83-10563# Institut Royal Meteorologique de Belgique, Brussels.

WIND POWER POTENTIAL IN BELGIUM

L. VANDERAUWERA, F. DEMEYER, and L. M. MALET 1982 24 p refs

(PUBL-SER-B-115; ISSN-0770-4615) Avail: NTIS HC A02/MF A01

The Weibull three-parameter model is discussed for estimation of mean wind power densities. This probability density function is a generalization of a number of more conventional density functions. Using wind speed observations, it is shown that this model generally gives a more reliable fit to the empirical wind speed frequency data than the density functions with one or two parameters. Wind power density estimations turn out to be strongly dependent on the hypothesized probability density function. The variation with height of the three parameters of the discussed model is investigated; no simple height dependence can be proposed. The variability of the yearly mean wind power with time is examined for three stations in Belgium and it is found that deviations of + or - 20 percent of the overall mean value may occur. The geographical variation of the mean wind power density and two examples of a contour map for the generator capacity factor are presented. Author

N83-10570# Iowa State Univ. of Science and Technology, Ames.

FOSSIL-ENERGY Annual Report, 1 Oct. 1980 - 30 Sep. 1981

Mar. 1982 146 p refs Prepared for Pittsburgh Mining Technology Center, Pa.

(Contract W-7405-ENG-82)

(DE82-018269; IS-4794) Avail: NTIS HC A07/MF A01

Methods for analysis, physical properties, microstructure, and methods for preparation and cleaning of coals are discussed.

N83-10571# Iowa State Univ. of Science and Technology, Ames.

RAPID ANALYSIS OF MINERAL CONTENT OF COAL: DEVELOPMENT OF AN ON-LINE MONITORING INSTRUMENT FOR PYRITE AND ASH IN COAL

J. E. RENSON and R. A. JACOBSON *In its Fossil-Energy* p 1-12 Mar. 1982

Avail: NTIS HC A07/MF A01

The feasibility of developing a computer-controlled monitor to measure the quantitative and qualitative pyrite and mineral content in coal using X-ray powder diffraction techniques was investigated. The 15 deg pyrite peak is used to measure the pyrite content, since there are no interfering peaks near it caused by the presence of common minerals. It is practical to measure down to 0.5% pyrite in a coal matrix, although with extreme care and long run times, measurement down to 0.2% is possible. The coal is ground to 60 mesh unless mineral matter is being measured, in which case -200 mesh samples are used. The same diffracted intensity is obtained from a low density sample regardless of whether it is

2.5 mm thick or 'infinitely' thick. The sensitivity of the method is reduced by the presence of highly absorbing material. To overcome this problem, an X-ray source at molybdenum radiation wavelength is used, decreasing the linear absorption coefficient to 115 cm⁻¹. Refinements of data analysis techniques are summarized. J.D.

N83-10572# Iowa State Univ. of Science and Technology, Ames.

ASHING PROPERTIES OF COAL BLENDS

D. L. BIGGS *In its Fossil-Energy* p 13-36 Mar. 1982 refs

Avail: NTIS HC A07/MF A01

The fusion properties of sulfur materials present in coals were investigated. The treatment of the samples of eleven different coals is described. Thermal treatment of low temperature ashing (LTA) concentrates of eight of the coals was performed, and raw and wash ashing curves were examined to determine what quantitative correlations, if any, exist between ashing parameters and rank of coal. The actual form of the function which describes the ashing curve is derived. J.D.

N83-10573# Iowa State Univ. of Science and Technology, Ames.

COAL PREPARATION AND TESTING

D. BIRLINGMAIR and R. FISHER *In its Fossil-Energy* p 37-47 Mar. 1982

Avail: NTIS HC A07/MF A01

Upgrading of the pilot plant large scale test facility for testing and evaluating coal preparation equipment, processes, and instrumentation, and for producing large quantities of coal of required specification prepared under controlled conditions is described. A fact sheet describing the coal preparation plant is presented. J.D.

N83-10574# Iowa State Univ. of Science and Technology, Ames.

PERFORMANCE CHARACTERISTICS OF HEAVY MEDIA CYCLONES USING FLY ASH-DERIVED HEAVY MEDIA

D. BIRLINGMAIR and M. J. MURTHA *In its Fossil-Energy* p 49-62 Mar. 1982

Avail: NTIS HC A07/MF A01

The potential for use of the magnetically separated iron-rich fraction of coal fly ash as heavy medium material for float-sink beneficiation of coal was investigated. Comparative coal beneficiation separations are made using commercial magnetite samples and magnetically separated fly ash samples. Laboratory experimentation is used to characterize the heavy media materials, determine particle durability, measure abrasion and corrosion of construction materials, compare media stabilities and viscosities, and determine flow circuit power requirements. Author

N83-10575# Iowa State Univ. of Science and Technology, Ames.

A SYSTEMATIC INVESTIGATION OF THE ORGANOSULFUR COMPONENTS IN COAL

T. G. SQUIRES and C. G. VENIER *In its Fossil-Energy* p 71-101 Mar. 1982 refs

Avail: NTIS HC A07/MF A01

Progress in the development of a highly efficient, low cost chemical method for removing organic sulfur from large quantities of coal is described. The evaluation of existing oxydesulfurization techniques; the modification of existing oxydesulfurization processes; the application of new and established chemical reactions to organosulfur materials; the development of new desulfurization processes; and the determination of the organosulfur functional group distribution in coal are summarized. J.D.

04 FUELS AND OTHER SOURCES OF ENERGY

N83-10576# Iowa State Univ. of Science and Technology, Ames.

MICROSTRUCTURE OF COAL

W. STRASZHEIM and R. T. GREER *In its Fossil-Energy* p 103-132 Mar. 1982 refs

Avail: NTIS HC A07/MF A01

The use of automatic image analysis in conjunction with a scanning electron microscope in order to rapidly measure trace elements in situ was investigated. The association of trace elements with the various organic and mineral phases and the size distribution of the affected phases are discussed. Direct organic sulfur determinations with application to both raw and processed coals and to various macerals within those coals are described. In particular, the technique is being applied with a view to establishing limits of confidence on the results produced, including the estimated difference in sulfur levels between determinations on different samples. J.D.

N83-10577# Iowa State Univ. of Science and Technology, Ames.

PHYSICO-CHEMICAL CLEANING AND RECOVERY OF COAL

T. D. WHELOCK *In its Fossil-Energy* p 133-145 Mar. 1982 refs

Avail: NTIS HC A07/MF A01

The development and demonstration of a method of depressing iron pyrites which is applicable to both the froth flotation and oil agglomeration methods of cleaning and recovering fine-size coal are described. Author

N83-10578# Argonne National Lab., Ill. Energy and Environmental Systems Div.

PROCEEDINGS OF THE US DEPARTMENT OF ENERGY/ARGONNE NATIONAL LABORATORY CONTRACTORS' RESEARCH AND DEVELOPMENT WORKSHOP: CONVERTING WASTE TO ENERGY

Feb. 1982 373 p refs Workshop held in Savannah, 1-4 Dec. 1981 Sponsored by DOE

(DE82-014337; ANL/CNSV/TM-96; CONF-811245) Avail: NTIS HC A16/MF A01

Waste energy utilization research is reported.

N83-10579# National Bureau of Standards, Washington, D.C. Thermal Processes Div.

A LABORATORY APPROACH TO OBTAIN SUSPENSION COMBUSTION DATA FOR REUSE DERIVED FUELS

A. MACEK and S. R. CHARAGUNDLA *In Argonne National Lab. Proc. of the US Dept. of Energy/Argonne National Lab. Contractors' Res. and Develop. Workshop* p 1-15 Feb. 1982 refs

Avail: NTIS HC A16/MF A01

Laboratory scale measurement of burning rates of entrained RDF samples is discussed. The resulting data are expected to be relevant for estimating the characteristics of (1) pulverized fuel combustion and (2) the suspension fraction of spreader stoker combustion. A furnace is described allowing direct measurement of fuel particle burning times as functions of the parameters of the entraining gas flow. Preliminary results on combustion of a pulverized coal sample in that furnace are presented. An ancillary study of entrainment characteristics of these samples was made in a cold flow elutriation apparatus. Settling velocity data are presented (1) for particles of controlled sizes, shapes and densities representative of RDF and (2) for two screened fractions of an RDF sample. These results will be used in subsequent RDF combustion studies. Author

N83-10580# National Bureau of Standards, Washington, D.C. Chemical Thermodynamics Div.

AN OXYGEN FLOW CALORIMETER FOR DETERMINING THE HEATING VALUE OF KILOGRAM SIZE SAMPLES OF MUNICIPAL SOLID WASTE

E. S. DOMALSKI, K. L. CHURNEY, A. E. LEDFORD, R. V. RYAN, and M. L. REILLY *In Argonne National Lab. Proc. of the US Dept. of Energy/Argonne Natl. Lab. Contractors' Res. and Develop. Workshop* p 16-32 Feb. 1982 refs

Avail: NTIS HC A16/MF A01

A calorimeter to determine the enthalpies of combustion of kilogram size samples of minimally processed municipal solid waste (MSW) in flowing oxygen near atmospheric pressure is discussed. The organic fraction of 25 gram pellets of highly processed MSW was burned in pure oxygen to CO₂ and H₂O in a small prototype calorimeter. The carbon content of the ash and the uncertainty in the amount of CO in the combustion products contribute calorimetric errors of 0.1 percent or less to the enthalpy of combustion. Large pellets of relatively unprocessed MSW have been successfully burned in a prototype kilogram size combustor at a rate of 15 minutes per kilogram with CO/CO₂ ratios not greater than 0.1 percent. The design of the kilogram size calorimeter was completed and construction was begun. Author

N83-10581# Midwest Research Inst., Kansas City, Mo

AN ECONOMIC AND ENGINEERING ANALYSIS OF THE FULL-SCALE TROMMEL SCREEN OPERATIONS AT BALTIMORE COUNTY, MARYLAND

G. J. HENNON *In Argonne National Lab. Proc. of the US Dept. of Energy/Argonne Natl. Lab. Contractors' Res. and Develop. Workshop* p 33-47 Feb. 1982 refs

(Contract DE-AC03-80CS-24330)

Avail: NTIS HC A16/MF A01

A trommel screen installed at the Baltimore County municipal solid waste processing facility operated by Teledyne National is evaluated. The objectives of the program are to ascertain the physical performance of the trommel and the economics of operation. The purpose of the trommel is to improve air classified refuse derived fuel by removing fine material that is primarily composed of noncombustible small pieces of glass, metal, stones, dirt, and sand. A series of tests have been performed as a function of trommel feed rate and rotational speed in each of the four seasons to determine screening efficiency, energy requirements, costs, cost benefit ratio, and comparison to theory and models. Recommendations will be made for design and operational parameters. Author

N83-10582# National Bureau of Standards, Washington, D.C. Chemical Kinetics Div.

CHARACTERIZATION OF RDF PROPERTIES THROUGH HIGH PRESSURE DIFFERENTIAL SCANNING CALORIMETRY

W. TSANG and J. A. WALKER *In Argonne National Lab. Proc. of the US Dept. of Energy/Argonne Natl. Lab. Contractors' Res. and Develop. Workshop* p 48-64 Feb. 1982 refs

Avail: NTIS HC A16/MF A01

High Pressure Differential Scanning Calorimetry was employed to study the thermal analytical properties of refuse derived fuels (RDF). By comparison with studies on newsprint and polyethylene, four characteristic thermogram peaks are identified with the smoldering combustion of plastics, cellulosic materials and two types of char respectively. Similarities and differences between thermograms of refuse derived fuels and coal samples are noted. The variability of thermal analytical properties as a function of process parameters, sampling, and source was determined. Finally, data from pyrolytic studies using thermogravimetry as well as scanning calorimetry are presented. Author

04 FUELS AND OTHER SOURCES OF ENERGY

N83-10584# Waste Management, Inc., Pompano Beach, Fla.
SOLID WASTE TO METHANE GAS (REFCOM)
H. P. MOOIJ /in Argonne National Lab. Proc. of the US Dept. of Energy/Argonne Natl. Lab. Contractors' Res. and Develop. Workshop p 72-91 Feb. 1982
Avail: NTIS HC A16/MF A01

RefCOM (refuse conversion to methane), a plant designed to test the commercial feasibility of producing methane gas from organic solid wastes is discussed. Author

N83-10586# WED Enterprises, Glendale, Calif.
WATER HYACINTH WASTEWATER TREATMENT SYSTEM
B. R. SCHWEGLER, JR. and C. A. LEE /in Argonne National Lab. Proc. of the US Dept. of Energy/Argonne Natl. Lab. Contractors' Res. and Develop. Workshop p 110-125 Feb. 1982 refs
Avail: NTIS HC A16/MF A01

A prototype water hyacinth wastewater treatment system which is in operation is discussed. The water hyacinth system requires less than 50% of the energy needed to run a comparably sized conventional secondary treatment system. When coupled with primary treatment, the water hyacinth system demonstrates removal of 80-90% total suspended solids and B.O.D., meeting secondary treatment standards. In the first year of operation, water hyacinth production yielded 47.8 dry metric tons/hectare year. The effects of varying harvest routines and detention times are investigated to optimize wastewater treatment and biomass production. Nutrient removal and biomass conversion to methane gas are investigated. E A K.

N83-10587# PIDC-Energy Development Corp., Philadelphia, Pa.
THE FEASIBILITY OF REFUSE-FIRED ENERGY GENERATION IN PHILADELPHIA, PENNSYLVANIA
W. M. CHRISTMAN, III /in Argonne National Lab. Proc. of the US Dept. of Energy/Argonne Natl. Lab. Contractors' Res. and Develop. Workshop p 131-139 Feb. 1982 refs
Avail: NTIS HC A16/MF A01

The City of Philadelphia presently disposes of 816, 480 megagrams per year (MGY) of residential refuse, with 1 megagram = 10 to the 3rd power kilograms. Alternatives to a base case of continued incineration and landfilling are evaluated. It is assured that the feasibility studies will yield compatible products and will run a uniform economic analysis against the base case, using as inputs the outputs of the feasibility analyses. E.A.K.

N83-10590# PSE and G Research Corp., Newark, N.J.
SEWAGE SLUDGE AS A SUPPLEMENTARY UTILITY BOILER FUEL
M. L. ZWILLENBERG, C. R. GUERRA, and J. H. SINGLETARY /in Argonne National Lab. Proc. of US Dept. of Energy/Argonne Natl. Lab. Contractors' Res. and Develop. Workshop p 181-195 Feb. 1982 refs
Avail: NTIS HC A16/MF A01

The feasibility of utilizing sewage sludge as a supplementary boiler fuel was studied. Samples of sludge from sewage are gathered for chemical analysis to determine the range of variation of composition and to select typical sludge compositions. Combustion tests are performed, and the effects of sludge combustion on utility boiler performance, corrosion, emission and economics is estimated. Design criteria for boilers convertible to sludge burning will be developed and a survey of the U.S. utility boiler population enables the estimation of the potential market for sludge as a fuel. E.A.K.

N83-10591# North Texas State Univ., Denton Dept of Chemistry
URBAN WASTE AS A POTENTIAL SOURCE FOR BRICK PLANTS
K. E. DAUGHERTY, A. EBERENDU, J. GRIFFIN, H. GEGBE, C. IKE, and A. ABOO /in Argonne National Lab. Proc. of US Dept. of Energy/Argonne Natl. Lab. Contractors' Res. and Develop. Workshop p 196-210 Feb. 1982 refs
Avail: NTIS HC A16/MF A01

A joint government/industry/university project was formulated to address the technical feasibility of utilizing municipal solid waste (MSW) as a commercial fuel for the brick industry. Specifically, refuse derived fuel (RDF) from MSW was investigated for three potential applications in the brick industry: (1) rotary brick kilns; (2) tunnel brick kilns; and (3) moisture dryers. The successful development of such a procedure would be a dramatic achievement with widespread applicability, transferability, and commercial merit for energy displacement. The sampling, collection, and analysis of MSW, the analysis of RDF, and the potential utilization of RDF as an alternate source of fuel for the brick industry are described. M.G.

N83-10592# Combustion Power Co., Inc., Menlo Park, Calif
DEVELOPMENT OF A SOLID WASTE FIRED FLUIDIZED BOILER, PHASE 1
L. C. PREUIT /in Argonne National Lab. Proc. of US Dept. of Energy/Argonne Natl. Lab. Contractors' Res. and Develop. Workshop p 211-225 Feb. 1982 refs
Avail: NTIS HC A16/MF A01

Tests were conducted to develop solid waste fired fluid bed boiler (FBB) technology. The fluid bed facility incorporates water tubes for heat extraction and can burn over seven tons of refuse derived fuel per day. Municipal solid waste from surrounding communities is shredded and air classified to remove inerts and recoverable materials. Current and past work shows that a fluid bed boiler will be able to operate at excess air levels well below those presently required by conventional grate-type waste fired boilers, and with comparable or superior combustion efficiencies. Tests were conducted to investigate the range of process conditions over which satisfactory operation can be maintained; suppression of acid gas emissions; recycle of elutriated fines back to the fluid bed, and fuel technology. In previous testing, operation was stable while firing refuse derived fuel for the duration of a 300-hour test. No agglomeration of bed material or slag formation was experienced. Low excess air, low exhaust gas emissions, and constant bed temperature demonstrated feasibility of steam generation from fluid bed combustion. M.G.

N83-10594# SCS Engineers, Covington, Ky.
DEMONSTRATION OF LANDFILL GAS ENHANCEMENT TECHNIQUES IN LANDFILL SIMULATORS
J. J. WALSH and W. G. VOGT /in Argonne National Lab. Proc. of US Dept. of Energy/Argonne Natl. Lab. Workshop p 266-284 Feb. 1982 refs
Avail: NTIS HC A16/MF A01

Various techniques to enhance gas production in sanitary landfills were applied to landfill simulators. These techniques include (1) accelerated moisture addition, (2) leachate recycling, (3) buffer addition, (4) nutrient addition, and (5) combinations of the above. Results are compiled through on-going operation and monitoring of sixteen landfill simulators. These test cells contain about 380 kg of municipal solid waste. Quantities of buffer and nutrient materials were placed in selected cells at the time of loading. Water is added to all test cells on a monthly basis; leachate is withdrawn from all cells (and recycled on selected cells) also on a monthly basis. Daily monitoring of gas volumes and refuse temperatures is performed. Gas and leachate samples are collected and analyzed on a monthly basis. Leachate and gas quality and quantity results are presented for the first 18 months of operation. M.G.

04 FUELS AND OTHER SOURCES OF ENERGY

N83-10595# Engineering-Science, Inc., Arcadia, Calif.
RESEARCH, DEVELOPMENT AND DEMONSTRATION IN THE DESIGN OF SANITARY LANDFILL TO OPTIMIZE THE GENERATION AND CAPTURE OF COMPRESSIBLE GAS
 M. E. NOSANOV, F. E. TEEPLE, and S. C. BUESCH (City of Los Angeles Dept. of Public Works) / In Argonne National Lab. Proc. of US Dept. of Energy/Argonne Natl. Lab Contractors' Res. and Develop. Workshop p 336-354 Feb. 1982 refs
 Avail: NTIS HC A16/MF A01

The influences of selected factors on the generation and recovery of methane gas from sanitary landfills were investigated. The factors included encapsulation, shredding, air classifying, moisture, and pH. Facilities consisting of six model sanitary landfill cells, each with a capacity of approximately 450 cubic yards of municipal waste, and auxiliary subsystems were constructed. Municipal waste in each cell is contained in a 30-mil thick polyvinyl chloride plastic sheeting forming a virtually gas-tight envelope. Two cells were filled with as-collected urban waste, two with shredded waste, and two with shredded and air classified waste, constituting three pairs of cells. One of each pair is a control cell with the other used as an experimental variable. Systems were provided for adding measured amounts of water, removing and recirculating leachate, and for extracting gas and measuring gas flow. During testing, gas production and internal cell characteristics were measured to determine the effects of mechanical processing, moisture content, and leachate pH. M.G.

N83-10596# New York State Energy Research and Development Authority, Albany.

LANDFILL GAS RECOVERY: AN ANALYSIS OF RESULTS

J. M. PETERSON / In Argonne National Lab. Proc. of US Dept. of Energy/Argonne Natl. Lab Contractors' Res. and Develop. Workshop P 355-364 Feb 1982 refs
 Avail: NTIS HC A16/MF A01

Aspects of landfill gas recovery including the range of gas recovery, production rates, corrosion, medium-Btu industrial applications, and conversion to electricity via an internal combustion engine were investigated. It is estimated that the landfill site studied is capable of producing more than 2.17×10 to the 13th power Btu's of gas per year for a period of over eight years. M.G.

N83-10606# Foster-Miller Associates, Inc., Waltham, Mass.
EVALUATION OF THE KLOSWALL LONGWALL MINING SYSTEM Final Report

P. J. GUAY Apr. 1982 131 p refs
 (Contract DE-AC01-76ET-12489)
 (DE82-015881; DOE/ET-12489/T1) Avail: NTIS HC A07/MF A01

A new longwall mining system specifically designed to extract a very deep web (48 inches or deeper) from a longwall panel was studied. Productivity and cost analysis comparing the new mining system with a conventional longwall operation taking a 30 inch wide web is presented. It is shown that the new system will increase annual production and return on investment in most cases. Conceptual drawings and specifications for a high capacity three drum shearer and a unique shield type of roof support specifically designed for very wide web operation are reported. The advantages and problems associated with wide web mining in general and as they relate specifically to the equipment selected for the new mining system are discussed. DOE

N83-10611# Davis Energy Group, Calif.
FEASIBILITY STUDY OF GEOTHERMAL HEATING, MODOC LASSEN HOUSING PROJECT

Nov. 1981 26 p
 (Contract DE-FG06-79ET-27256)
 (DE82-015099; DOE/ET-27256/T10) Avail: NTIS HC A03/MF A01

The feasibility of using geothermal water for space and domestic water heating systems is evaluated. For the six units considered, the space heating load is four times the domestic water heating load. Since the geothermal water temperature is uncertain, two scenarios were evaluated. In the first, which assumes 1600F supply

temperature, the geothermal system is assumed to satisfy the entire space and domestic water heating loads. In the second, which assumes the supply temperature to be less than 1200F at the wellhead only space heating is provided. The economics of the first scenario are quite favorable. The investment is even more favorable for the second scenario, due to the higher cost and lower resultant savings for the domestic water components. Forced air space heating from geothermal is recommended. Domestic water heating is recommended pending additional information on supply water temperature. DOE

N83-10613# Tennessee Valley Authority, Muscle Shoals, Ala.
 Office of Agricultural and Chemical Development.

BIOMASS FUELS UPDATE. TVAS BIOMASS FUELS PROGRAM

Feb. 1982 28 p
 (DE82-904990; TVA/OACD-82/9) Avail: NTIS HC A03/MF A01

Equipment was installed and tests were conducted on the ethanol from hardwood project. Location of hardwoods, to improve forest management, and to reduce the cost of harvesting woody biomass was assessed. Substantial underutilized cropland exists in the Valley, and a questionnaire survey was administered to supplement available cropland data. The potential liquid fuel yields and production management practices for alternative starch, sugar, and vegetable oil crops were determined to obtain benchmark data and to evaluate alcohol production from alternative agricultural feedstocks. Workshops were conducted to provide information on production of alcohol. DOE

N83-10615# Technische Hochschule, Aachen (West Germany).
 Inst. fuer Eisenhuettenkunde.

PRESSURE-SWINGING UNDERGROUND GASIFICATION. THEORETICAL AND EXPERIMENTAL INVESTIGATIONS OF GASIFICATION, PHASE 2 Final Report, Oct. 1981

M. MOHTADI, P. BREIDUNG, F. FUHRMANN, K. GUNTERMANN, M. KURTH, M. PAERSCH, G. ROPERTZ, and G. SUBKLEW
 Bonn Bundesministerium fuer Forschung und Technologie May 1982 114 p refs Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-066; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 24

Simulation experiments were run in order to determine the form of the combustion front, the combustion front velocity, the different type of gases liberated, the effect on quality of steam/oxygen ratio, the efficiency of gasification process, and data for regulating and conducting from the surface the channel gasification process. The simulation of the channel gasification process was performed in coal samples 0.32 m in diameter, 4 m long with an axial channel of 3 cm in diameter. Samples were put in an autoclave working at 1 bar or 10 bar pressure. The simulation of the penetration process was performed with coal samples 1 m long and 170 mm in diameter put in an autoclave able to work at 100 bar pressure. It is stated that the penetration process not usable is without a preliminary increase of coal permeability. Reverse combustion was also tested at pressures of 1 and 10 bar. Theoretical investigations simulated a nonstationary gasification. It is shown that this method is usable in case of oxidizing gasification. Practical confirmation of the computation has to be carried out. The reaction constants by air/steam gasification are calculated. A stationary model studied the effect of gas temperature, of steam/coal ratio, and pressure.

Author (ESA)

04 FUELS AND OTHER SOURCES OF ENERGY

N83-10616# Bergbau-Forschung G.m.b.H., Essen (West Germany) Abteilung Physikalische Chemie.

STEAM GASIFICATION OF COAL, PROJECT PROTOTYPE PLANT NUCLEAR PROCESS HEAT: REPORT AT THE END OF THE REFERENCE PHASE Final Report, Dec. 1980

K. H. VANHEEK Bonn Bundesministerium fuer Forschung und Technologie May 1982 271 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-T-82-069; ISSN-0340-7608) Avail: NTIS HC A12/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 43,50

The work carried out in the field of steam gasification of coal is described. On the basis of the status achieved to date, it can be stated that the mode of operation of the gas generator developed, including the direct feeding of caking high volatile coal, is technically feasible. Moreover, throughput can be improved by 65% at minimum by using catalysts. On the whole, industrial application of steam gasification, using nuclear process heat, stays attractive compared with other gasification processes. Not only coal is conserved, but also the costs of the gas manufactured are favorable. As confirmed by recent economic calculations, these are 20 to 25% lower. Author (ESA)

N83-10617# Ruhrkohle A.G., Essen (West Germany).

PNEUMATIC STOWING WITH LATERAL DISCHARGE IN COAL FACES WITH THICK SEAMS Final Report, July 1981

H. D. SIELAFF Bonn Bundesministerium fuer Forschung und Technologie Jun. 1982 46 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie Prepared in cooperation with Bergbau A.G. Lippe and Bergwerk Nordstern (BMFT-FB-T-82-074; ISSN-0340-7608; RAG-K-330) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 9

A method of introducing early bearing and compact pneumatic stowing in thick coal beds was developed. In an early phase, the pneumatic stowing method with lateral discharge was tested in conjunction with special chock supports. Due to difficult geological conditions in the coal bed and to insufficient stability of the special chock support the trial failed after 7 months. The whole system was modified for pneumatic stowing with front discharge and shuttering. This method turned out to be unsuccessful as well. A shield support designed for pneumatic stowing with front discharge was used in another panel of the same coal bed. This method proved successful. Author (ESA)

N83-10623# Vereinigte Kesselwerke Duesseldorf (West Germany).

TECHNICAL STUDY ON THE POSSIBILITIES OF OIL SHALE COMBUSTION IN A FLUIDIZED BED FURNACE INCLUDING COST ESTIMATES FOR A PLANT TO BE BUILT Final Report, Jun. 1981

M. KUEHL and P. STELLER Bonn Bundesministerium fuer Forschung und Technologie Jun. 1982 70 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-T-82-085; ISSN-0340-7608; REPT-41.0801.43.11) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 13

The possibilities of oil shale combustion in a fluidized bed furnace were studied and the costs for a power plant were estimated. An overall concept of oil shale combustion in a fluidized bed furnace is drafted and the final plant size is established, allowing a scaling up of 200 t/hr steam. The concept was technically revised, resulting in a cost estimate of about 15% accuracy. Author (ESA)

N83-10625# Rheinische Braunkohlenwerke A.G., Cologne (West Germany). Abt. Forschung und Entwicklung.

PHOTOTYPE PLANT FOR NUCLEAR PROCESS HEAT (NPH), REFERENCE PHASE. R AND D WORK ON HYDROGENATED COAL GASIFICATION (HCG). FURTHER OPERATION OF SEMI-INDUSTRIAL PLANT FOR HYDROGENATED COAL GASIFICATION Final Report, Dec. 1980

R FLADERER and L SCHRADER Bonn Bundesministerium fuer Forschung und Technologie Jul. 1982 103 p refs In GERMAN, ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-T-82-098; ISSN-0340-7608) Avail: NTIS HC A06/MF A01, Fachinformationszentrum, Karlsruhe, West Germany DM 21,50

In view of a scale up, leading to a commercial HCG, further R and D work was performed on the 100 kg C/hr prototype plant. The inclined tube for feeding coal into the fluidized bed, the raw gas/hydrogenation gas heat exchanger, and the modified hydrogen source were tested. Influence on carbon gasification efficiency of dimension of coal particles, humidity of coal, hydrogen content of gasification gas, introduction place of coal in gasifier, height of fluidized bed, and ash content of coal were studied. The plant was operated for 19,400 hr, of which more than 7400 hr under gasification conditions. Carbon gasification rates up to 82% with methane content up to 48% were obtained. Author (ESA)

N83-10629# Technische Universitaet, Brunswick (West Germany) Inst. fuer Waerme- und Brennstofftechnik

COMPUTERIZED SIMULATION OF THE DYNAMIC RESPONSE OF A COAL-FIRED POWER PLANT WITH PRESSURIZED FLUIDIZED BED Final Report, Nov. 1981

J PLACKMEYER Bonn Bundesministerium fuer Forschung und Technologie Jul. 1982 45 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-T-82-094; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 9,50

The simple way of desulfurizing, the efficient combustion of coal, and low carbon monoxide flue gas content of a fluidized bed combustion installation were studied. The dynamic response of a pressurized fluidized bed should also be studied before any construction is started. The physical-mathematical models of all single components were developed and combined in a total computer program. Starting point was the planned pilot plant with gas turbine engine. Various modifications of the purely air cooled plant as well as the extension to a combined cycle with additional steam turbine were considered. Operating cases were simulated: starting up, increasing from partial load to full load and vice versa, shut down and breakdowns. Results show that all operating cases could be brought under control as well as breakdowns. The constructive precautions and correct plant practice are described. Author (ESA)

N83-10631# Schaefer (Arnold) G.m.b.H., Saarwellingen (West Germany).

DRY PROCESSING OF POWER PLANT COAL RICH IN INERTS Final Report, Apr. 1981

J. GROSS and H. DITZLER Bonn Bundesministerium fuer Forschung und Technologie Jul. 1982 71 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-T-82-101; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 15

A system for pneumatic classifying was constructed in order to examine the effects of quality and composition of coal as well as the machine-related factors, such as the sieve shaking frequency, sieve hole size, air distribution, position of the separating weirs, and arrangement of the charging chute. It was determined that the Berry pneumatic table fulfills the requirements for product purity when the supply of material is held constant and the machine related factors are optimized. For a bituminous coal with a mean ash content between 40% and 50%, the best separation results

04 FUELS AND OTHER SOURCES OF ENERGY

were obtained. At a purity rate of inerts of over 97%, it was possible to reduce the ash content of the coal by 20%. Due to its compactness, the system can be put in operation at different sites. It is economic to operate, and can be adapted to any required capacity as a result of its modular design. During the tests a high degree of wear was noted on the fan and fan housing. The fan housing was protected to a great extent by synthetic plates.

Author (ESA)

N83-10638# Louisiana State Univ., Baton Rouge. Energy Program Office.

THE DEVELOPMENT OF A GEOPRESSURED ENERGY MANAGEMENT INFORMATION SYSTEM IN SUPPORT OF RESEARCH PLANNING, PHASE 1 Annual Report, Mar. 1980 - Oct. 1981

A. L. BACHMAN and F. WRIGHTON Oct. 1981 55 p Sponsored by Gas Research Inst.

(PB82-207366; GRI-81/0005) Avail: NTIS HC A04/MF A01 CSCL 10A

The development of an information system on the problems and potential of geopressured gas containing aquifers as well as what is known about unconventional gas production in the Gulf Coast, and the use of this information to formulate a research program to prove economic and technical feasibility is discussed. This work led to the conclusion that of six major conventional gas resource options in the Gulf Coast, the one involving gas recovery from reservoirs watered out due to prior production offers the greatest potential in the short term. In these water drive reservoirs, gas is trapped in the pore space as water invades the reservoir (due to gas production). This gas can be recovered by reducing the pressure in the reservoir and thereby causing the trapped gas to expand and become mobile. The reduction in reservoir pressure is achieved by high rate water production. The conclusions drawn from analyses of the potential for gas recovery from unconventional sources in the Gulf Coast as well as research and testing already completed are the basis for the proposed research program. The process by which the research program was formulated, intermediate results and the program itself are summarized.

Author

N83-10640# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.

GEOTHERMAL COMMUNITY HEATING FOR CAPE CHARLES, VIRGINIA

C. S. LEFFEL, JR Oct. 1981 28 p refs

(Contract DE-AI01-79ET-27025)

(PB82-184003; JHU/APL/QM-81-133) Avail: NTIS HC A03/MF A01 CSCL 13A

An economic feasibility study for a geothermal community heating system was made for the residential heat load of Cape Charles, Virginia using a computer program. The effects of inflation, interest rates, wellhead temperatures, and the addition of reinjection wells are investigated. It is concluded that the utilization of geothermal energy would be feasible if well flows of 500 gal/minute could be obtained and if reinjection of the geothermal fluids were not required. A comparison of the geothermal assisted community system with a coal fired system shows that the coal fired system may be the most attractive alternative to the heating of homes with individual oil fired furnaces.

Author (GRA)

N83-10641# Gas Research Inst., Chicago, Ill.

SYMPOSIA ON PULSE-COMBUSTION APPLICATIONS AND CONDENSING HEAT EXCHANGERS

4 Mar. 1982 65 p Symp. held in Atlanta, 2-4 Mar. 1982 Sponsored in part by Battelle Columbus Labs., DOE and Brookhaven National Lab.

(PB82-184086; GRI-82/0009.1) Avail: NTIS HC A04/MF A01 CSCL 13A

Fuel-firing equipment designed to take advantage of the phenomena of combustion-driven pulsations is discussed. Heat exchangers that are designed to operate in the condensing mode to recover a portion of the water vapor formed in the combustion process are discussed.

Author (GRA)

N83-10643# Solar Energetics, Inc., Wilmington, Del.

GEOTHERMAL ENERGY MARKET STUDY ON THE ATLANTIC COASTAL PLAIN: DOVER AIR FORCE BASE GEOTHERMAL ENERGY EVALUATION

Dec 1981 40 p refs Prepared for Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.

(Contract N00024-81-C-5301; DE-AI01-79ET-27025)

(PB82-183997; JHU/APL/QM-81-144) Avail: NTIS HC A03/MF A01 CSCL 10A

The technical and economic feasibility of the utilization of geothermal energy was examined. Under the load, resource, and economic conditions, the geothermal evaluation is favorable. There is no prescribed method for evaluating economic feasibility. The results of one computer program was developed for technical assistance and technology transfer are shown. Other geothermal feasibility studies for site specific locations are listed.

GRA

N83-10652# Saarberg-Hoelter-Umwelttechnik G.m.b.H., Saarbruecken (West Germany).

RECONSTRUCTION AND TESTING OF THE FLUE GAS DESULFURIZING PLANT: WEIHER 2 Final Report, May 1981

H. IGELBUESCHER, H. GRESCH, W. FISCHER, S. MIERSCH, and F. HOFMANN Bonn Bundesministerium fuer Forschung und Technologie Jul. 1982 133 p refs In GERMAN;

ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-108; ISSN-0340-7608) Avail: NTIS HC A07/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 28

Cleaning flue gas produced by the combustion of chloride rich combustibles was studied. A secondary water disposal problem arises due to the chloride content if industrial usable gypsum is produced. If the washing water is recycled, its calcium chloride content concentrates till precipitation occurs. A test program was conducted to control increasing chloride concentration through off-watering small quantities of the washing water, and to produce an optimal gypsum quality. The off-water which contained 30% by weight of calcium chloride was centrifuged for the recovery of the gypsum and the calcium chloride was then eliminated by crystallization through steam evaporation. Gypsum with a residual humidity of less than 10% by weight of free water, and calcium chloride 99% pure were obtained in nearly all test runs. Optimal operation of the washing fluid with a calcium chloride content from 10% to maximum 20% by weight of CaCl₂ is feasible to obtain the requirements of the gypsum industry, namely less than 10% water and less than 0.01% C₁, and at the same time produce usable CaCl₂.

Author (ESA)

N83-10705# Technische Universitaet, Clausthal-Zellerfeld (West Germany). Inst. fuer Tiefbohrkunde und Erdoelgewinnung

DEVELOPMENT OF NEW AND IMPROVEMENT OF EXISTING CORE RECOVERY METHODS Final Report, Mar. 1981

C. MARX and E. J. KROEMER Bonn Bundesministerium fuer Forschung und Technologie Jun 1982 207 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-091; ISSN-0340-7608) Avail: NTIS HC A10/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 36,50

Prospecting of new oil and gas fields through sampling of soil by core drilling was investigated. Two core recovery methods were designed; corresponding prototypes were built and tested. The drill mandrel, the core barrel closing system, sollicitation of the barrel by hydraulic friction, and sollicitation of the driving axle during side drilling were studied. The core barrel system with built in hydrostatic drill motor and diamond bit drill was retained. This combination leads to a core sample recovery rate of over 90% and a drill speed increase of 40% over the rotary core sampling system. The KIBM-1 prototype was tested in five drilling applications in deep wells. The sidewall conng system permits recovery of core material from the bore hole wall for boreholes at least eight and a half inches in diameter.

Author (ESA)

04 FUELS AND OTHER SOURCES OF ENERGY

N83-10719# Friedrichs (Theodor) und Co., Schenefeld (West Germany). Meteorologische Geräte und Systeme.

SIMPLE ANEMOMETER FOR WIND CLASSIFICATION Final Report, Feb. 1981

H. J. FRIEDRICHS, B. LORENZEN, and A. HAUG (Fachhochschule, Aachen) Bonn Bundesministerium fuer Forschung und Technologie Jul. 1982 29 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-106; ISSN-0340-7608) Avail: NTIS HC A03/MF A01, Fachinformationszentrum, Karlsruhe, West Germany DM 6

Development of a simple wind velocity data acquisition system independent of an external power supply and operating for long durations without supervision was considered. The data are essential for possible location of windmills. Automatic classification of data in wind velocity categories was also considered. Equipment consisted of an anemometer with a Reed contact as impulse emitter, an indicator for 4 or 6 wind velocity categories, and four 1.5 V electric batteries, assuring a four month supply. Wind integration time was 6 or 10 minutes. Tests in laboratory, in environmental test chamber, in wind tunnel, and outdoors gave satisfying results. Outdoor tests lasted three months, with temperatures ranging from minus 14 C to plus 17 C, winds from zero to gale force, relative humidity from 25 to 100%, and precipitations of rain, hailstones, and snow. Author (ESA)

N83-10756# Virginia Polytechnic Inst and State Univ, Blacksburg.

MICROBIOLOGICAL STUDIES TOWARDS OPTIMIZATION OF METHANE FROM MARINE PLANT BIOMASS Annual Report, 1 Jul. 1980 - 30 Jun. 1981

J. G. FERRY and J. S. CHEN Jul. 1981 15 p (PB82-214362; GRI-81/0009) Avail: NTIS HC A02/MF A01 CSCL 06M

The microbiological conversion of marine plant biomass was studied with stabilized kelp-degrading methane-producing enrichment cultures. Mannitol and alginate are used concurrently. Ethanol is produced shortly after feeding kelp and subsides rapidly. Dissolved hydrogen ranged from 5 nM to 1.2 uM. The appearance of ethanol correlates with increased hydrogen levels which is expected if interspecies hydrogen transfer functions to maintain low concentrations of the more reduced fermentation products. An improved method was developed for measurement of volatile fatty acids in sea water medium based on gas chromatography of the phenyl ester derivatives. Acetate and propionate were found in the greatest concentrations with formate, butyrate and isobutyrate in lower concentrations. The pool sizes will be used with turnover rate constants to determine total flux of each intermediate. A strain of *Methanococcus mazei* has been isolated that degrades acetate to methane. Also, a highly enriched culture of a previously unreported acetate-degrading methanogen was obtained. New strains of hydrogen and formate-utilizing methanogens were isolated. Mannitol and alginate degrading strains were isolated that resemble *Cytophaga* sp. Formate dehydrogenase from *Methanobacterium formicicum* was purified 71-fold and initially characterized. The isolated enzyme contains a cofactor not previously reported in methanogens. Author

N83-11340*# National Aeronautics and Space Administration Lewis Research Center, Cleveland, Ohio.

RECENT TRENDS IN AVIATION TURBINE FUEL PROPERTIES

R. FRIEDMAN Oct. 1982 33 p refs (NASA-TP-2056; E-1127; NAS 1.60:2056) Avail: NTIS HC A03/MF A01 CSCL 21D

Plots and tables, compiled from Department of Energy (and predecessor agency) inspection reports from 1969 to 1980, present ranges, averages, extremes, and trends for most of the 22 properties of Jet A aviation turbine fuel. In recent years, average values of aromatics content, mercaptan sulfur content, distillation temperature of 10 percent recovered, smoke point, and freezing point show small but recognizable trends toward their specification limits. About 80 percent of the fuel samples had at least one property near specification, defined as within a standard band

about the specification limit. By far the most common near-specification properties were aromatics content, smoke point, and freezing point. Author

N83-11349# Cornell Univ., Ithaca, N. Y. School of Chemical Engineering

COMPUTER SIMULATION AND MOLECULAR THEORY STUDIES OF NATURAL GAS MIXTURES Annual Report, 1 Jan. 1980 - 31 Dec. 1980

K. E. GUBBINS 31 Jan. 1982 22 p refs Sponsored by Gas Research Inst. (PB82-22060; GRI-81/0040) Avail: NTIS HC A02/MF A01 CSCL 21D

A technique was developed which enables the chemical potential to be calculated accurately in liquid mixtures by computer simulation. Calculations produce activity coefficients and Henry constants with an accuracy of 1 to 2%. Results were obtained for highly nonideal mixtures, and were used to test predictive methods for such mixtures. Simulation methods for studying polar liquids were also developed. The perturbation theory equation of state was compared with existing engineering methods, and was found to give much better results for mixtures containing polar fluids, particularly when no mixture data is available. This equation of state was used to study supercritical fluid equilibria. Correlations for Henry constants for systems with dissolved gases or solids were developed. M.G.

N83-11350# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

PROPULSION AND ENERGETICS PANEL, WORKING GROUP 13 ON ALTERNATIVE JET ENGINE FUELS. VOLUME 1: EXECUTIVE SUMMARY

R. B. WHYTE, ed. Jul. 1982 16 p 2 Vol. (AGARD-AR-181-VOL-1; AD-A119916) Avail: NTIS HC A02/MF A01

Alternative fuels for gas turbine engines which may entail considerable changes in fuel properties and relaxation of key items in present specifications to ensure adequate supplies are studied. The physical properties as well as the hydrocarbon composition of the fuels and their effects on handling and storage, aircraft fuel systems and engines are investigated. S.L.

N83-11351# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

PROPULSION AND ENERGETICS PANEL, WORKING GROUP 13 ON ALTERNATIVE JET ENGINE FUELS. VOLUME 2: MAIN REPORT

R. B. WHYTE, ed. Jul. 1982 169 p 2 Vol. (AGARD-AR-181-VOL-2; AD-A119917) Avail: NTIS HC A08/MF A01

Supply/demand of jet engine fuels for use by the in aeronautical research and development efforts was forecast. The effects of potential variations in hydrocarbon fuel properties on the performance, operating envelope, exhaust emissions, durability, maintainability, reliability and safety of aviation gas turbine aircraft was assessed. S.L.

N83-11364# Technische Universitaet, Clausthal-Zellerfeld (West Germany). Inst. fuer Tiefbohrkunde und Erdoegewinnung.

IMPROVEMENT OF THE CASING CEMENTATION OF DEEP AND ULTRADEEP WELLS. PART 1: DRILLING MUDS AND WASHING FLUIDS Final Report, May 1981

K. H. ARENS and M. AKSTINAT Bonn Bundesministerium fuer Forschung und Technologie Jul. 1982 137 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie 2 Vol. (BMFT-FB-T-82-111-PT-1; ISSN-0340-7608) Avail: NTIS HC A07/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 29

Drilling muds, washers, and washing fluids were investigated in order to improve the casing cementation of deep and ultra-deep wells. Rheological requirements, the temperature stability of mud systems and the properties of nondamaging drilling muds were

04 FUELS AND OTHER SOURCES OF ENERGY

studied. For washing fluids, two test methods were developed and the necessity of filter cake removal was shown. The efficiency of several washing fluids was compared and evaluated for various mud systems (drilling muds with and without clays).

Author (ESA)

N83-11365# Technische Universitaet, Clausthal-Zellerfeld (West Germany). Inst. fuer Tiefbohrkunde und Erdoegewinnung. **IMPROVEMENT OF CASING CEMENTATION OF DEEP AND ULTRADEEP WELLS. PART 2: OILFIELD CEMENTS AND CEMENT ADDITIVES Final Report, May 1981**

K. H. ARENS and M. AKSTINAT Bonn Bundesministerium fuer Forschung und Technologie Jul. 1982 115 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie 2 Vol. (BMFT-FB-T-82-112-PT-2; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 24

Oilfield cements and cement additives were investigated in order to improve the casing cementation of deep and ultra-deep wells. Characterization and evaluation of the main oil field cements commercially available were studied. The testing was carried out according to American Petroleum Institute API standards and nonstandardized test methods (dynamic modulus of elasticity, expansion/shrinkage), especially the rheology, thickening time and the influence of pressure, temperature and water-cement ratio, were considered. The main emphasis in the field of cement additives was on the evaluation of cement retarders for high temperatures, accelerators, and additives for cement expansion. Furthermore oil field cements were tested, and their properties are described.

Author (ESA)

N83-11377# Energy and Environmental Research Corp., Santa Ana, Calif.

DEVELOPMENT OF CRITERIA FOR EXTENSION OF APPLICABILITY OF LOW-EMISSION, HIGH-EFFICIENCY COAL BURNERS Annual Report, Oct. 1979 - Oct. 1980

W. NURICK, R. PAYNE, J. LEE, P. CASE, S. CHEN, and D. PERSHING Oct. 1981 202 p

(Contract EPA-68-02-2667)

(PB82-197153; EPA-600/7-81-171C; QR-3) Avail: NTIS HC A10/MF A01 CSCL 13A

A program to develop criteria for extending the applicability of low emission, high efficiency coal burners is described. For the small scale fuel studies, 28 coals covering all ranks were tested under a wide variety of conditions to ascertain the impact of coal properties on the fate of fuel nitrogen (N). Significant accomplishments in this part of the program include: (1) bench scale test results confirm the pilot scale concept that decreasing the initial air/fuel ratio decreases fuel NO_x formation; (2) detailed studies on optimizing a staged combustion system suggest that the stoichiometry producing minimum NO_x emissions is a function of both fuel composition and primary zone conditions, (3) distribution of the total fixed nitrogen (TFN) species--NO, NH₃, and HCN--leaving the first stage strongly dependent on coal composition; (4) distribution of the first stage fuel N emissions has a significant impact on second stage exhaust NO emissions (minimum second stage NO emissions depend on competition between first stage NO and increased gas and solid phase N species); and (5) during staged combustion, increasing the rate of heat extraction from the first stage (fuel rich zone) decreases the decay of TFN species, but dramatically decreases TFN conversion in the second stage (first stage extraction reduces exhaust NO emissions).

GRA

N83-11500# Ishikawajima-Harima Heavy Industries Co. Ltd., Yokohama (Japan). Welding Research Inst.

WELDING OF AL-MG ALLOY 5083-0 FOR THE CONSTRUCTION OF LNG STORAGE TANKS

Y. KURIYAMA, K. MINODA, T. IRISAWA, and H. NAGAOKA 1981 29 p refs Presented at the HW-JIW Colloq. on Production Technol. and Quality Assurance, Nagoya, Japan, 15 Apr. 1981 Avail: NTIS HC A03/MF A01

Liquefied natural gas (LNG) is receiving increasing attention as the most important source of energy in the interim period before coal and nuclear energy can take their turn in large scale energy production. Among the key elements to constitute an LNG supply system are the LNG tankers to transport the fuel from the gas liquefaction stations overseas and the LNG tanks for storing the imported fuel in reception centers at home. The tankers now planned are mostly of the Moss type carrying spherically shaped aluminum alloy tanks installed independently of the ship's hull. The capacity increase of these tanks as well as their construction in larger numbers in recent years have largely been made possible by improving the weldability of materials, by the adoption of better designs, by rationalizing construction methods and by automation of welding operations. The total techniques involving the production of Al-Mg alloy 5083-0 thick plate and its welding fabrication are the techniques which have rapidly developed in keeping with the growing demand of LNG and therefore there still remain some subjects on which further study is called for. The subjects that have been studied so far are surveyed concerning welding processes of 5083-0 thick plates, mechanical properties of the welded joints and measures for the prevention of weld defects, intended mainly for LNG tank construction.

Author

N83-11583# Rycon, Inc., Cincinnati, Ohio.

PERFORMANCE ANALYSIS OF COFIRING DENSIFIED REFUSE DERIVED FUEL IN A MILITARY BOILER Final Report, Aug. 1980 - Sep. 1981

Tyndall AFB, Fla. Air Force Engineering and Services Center Dec 1981 93 p

(Contract MIPR-N-80-50; AF PROJ. 2054)

(AD-A118022; AFESC/ESL-TR-81-59) Avail: NTIS HC A05/MF A01 CSCL 21D

This report provides an overview of existing densified refuse-derived fuel (dRDF) receiving, storage, handling and combustion equipment at Wright-Patterson Air Force Base. dRDF is being burned as part of a long term alternative fuel evaluation program to develop design and procurement criteria for multiple fuel boilers. Recommendations are offered for specific equipment, procedural changes, and studies to improve the efficacy of the present configurations of dRDF as a fuel. A discussion of the fuel use criteria is presented. The options for continuing the present dRDF supply arrangement vs. the feasibility of local production of dRDF are presented. Research needs are summarized. A preemptive, integrated local synthetic solid fuel production facility and boiler performance test is recommended as a continuation of the program

Author (GRA)

N83-11587# Center Four Engineering, Redmond, Oreg.

BASIN VIEW GEOTHERMAL HEATING DISTRICT, KLAMATH FALLS, OREGON. CONCEPTUAL DESIGN AND ECONOMIC-FEASIBILITY STUDY REPORT

1 Jul. 1981 63 p Prepared for Oregon Inst. of Tech., Klamath Falls

(Contract DE-FG06-79ET-27256)

(DE82-015108; DOE/ET-27256/T20) Avail: NTIS HC A04/MF A01

The findings of a feasibility study performed for Basin View Heating District in Klamath Falls, Oregon are reported. The physical, economic, and political feasibility of establishing a geothermal heating district to provide space heat to housing units in the Basin View Development of Klamath Falls are determined. Of the several systems considered, all are physically feasible. The project is politically feasible if the owner complies with governmental requirements. Economic feasibility is based on considerations of money value rates, tax rates and expected rates of return, which

04 FUELS AND OTHER SOURCES OF ENERGY

are dependent on government and money markets. For analysis a money value rate of 21% and an owner's marginal tax rate of 35% were adopted. DOE

N83-11595# Imhausen-Chemie G.m.b.H., Lahr (West Germany). **THE JOINT AUSTRALIA/FEDERAL REPUBLIC OF GERMANY FEASIBILITY STUDY ON THE CONVERSION OF AUSTRALIAN COALS INTO LIQUID FUELS IN AUSTRALIA Final Report, Aug. 1981**

K. H. IMHAUSEN Bonn Bundesministerium fuer Forschung und Technologie Aug. 1982 111 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-T-82-133; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 23

The IG hydrogenation process used commercially in Germany up to 1945, was improved. Pilot plants in Germany are presently under construction or in the start-up phase. A technical concept for the conversion of Australian bituminous coals and/or Australian brown coals into automotive fuels, using coal hydrogenation, gasification and Fisher-Tropsch synthesis was developed. Development of technology, consumption figures and of expenditure/investment for a complete plant, producing about 3 million tons of automotive fuels per year, was also attempted. The results show that standard automotive fuels are produced from bituminous coal, using a combination of high pressure coal hydrogenation and of Fisher-Tropsch synthesis, and from brown coal, using high pressure coal hydrogenation only. Under the assumption that crude oil prices increase 3% more rapidly than yearly inflation, and the raw material cost are staying at a low level, commercial plants are planned. Author (ESA)

N83-11596# Stadtwerke Duisberg A.G. (West Germany). **STEAM GENERATOR WITH CIRCULATING ATMOSPHERIC FLUIDIZED BED COMBUSTION Final Report, Apr. 1981**

W. WEIN, H. HOEFFGEN, K. H. MAINTOK (Deutsch Babcock Anlagen AG), and G. DARADIMOS (Lurgi Chemie und Huettentechnik GmbH) Bonn Bundesministerium fuer Forschung und Technologie Aug. 1982 58 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-T-82-134; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 12

The combustion of coal in power plants by conventional combustion techniques is studied with emphasis on combustion in a circulating atmospheric fluidized bed (CFBC). The CFBC method stays half way between the classical fluidized bed with a well defined bed height and the pneumatic transport where particles and fluidizing gas have the same velocity. The main advantages of CFBC are: flexibility with respect to coal types; easy elimination of 80% of sulfur by mixing the coal with calcium carbonate to a molecular ratio Ca/S of about two; reduced nitrogen oxides production due to the low combustion temperature of 900 C; high steam production efficiency with the combustion degree exceeding 99%; high overall efficiency with no further desulfurizing being needed; easy regulation; high heat transmission rates (350 to 400 W/m²K) reducing exchange surfaces; small boiler building; and the possibility to build in one module a 300 MW unit.

Author (ESA)

N83-11600# Eschweiler Bergwerks-Verein A.G., Herzogenrath-Kohlscheid (West Germany). **UTILIZATION OF ANCIT PLANT BY-PRODUCTS Final Report, Feb. 1982**

F. BECKMANN Bonn Bundesministerium fuer Forschung und Technologie Aug. 1982 88 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-T-82-144; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 18,50

In the ANCIT process, briquets are produced composed of 70% low volatile coal, coke, and/or petroleum coke mixed with

30% caking coal as a binder heated at 500 C and hot pressed. A further development was to transform into economically usable products the by-products resulting from this process. The already existing production plant was modified to: collect and transform into usable form the dust and the condensable products contained in the hot gases evolving from the process; use the latent heat of these gases for drying a part of the primary coal used; tend to an autarkic process; and reduce pollution from air and water. A plant, to be planned, is able to utilize the ANCIT by-products economically. Author (ESA)

N83-11638# Geological Survey, Washington, D. C. **GEOLOGICAL STUDIES OF THE COST NUMBERS G-1 AND G-2 WELLS, UNITED STATES NORTH ATLANTIC OUTER CONTINENTAL SHELF**

P. A. SCHOLLE, ed. and C. R. WENKAM, ed. 1982 200 p refs (USGS-CIRC-861) Avail: NTIS HC A09/MF A01

Measurements of vitrinite reflectance, color alteration of visible organic matter, and various organic geochemical properties suggest that the tertiary and cretaceous strata of the COST Nos. G-1 and G-2 are not prospective for oil and gas. These sediments were not buried deeply enough for hydrocarbon generation, and the kerogen and extractable organic matter in them are thermally immature. However, the Jurassic rocks at the G-1 site do contain small amounts of thermally mature gas prone kerogens. The Jurassic rocks at COST No. G-2 are also gas prone and are slightly richer in organic carbon and total extractable hydrocarbons than the G-1 rocks, but both sites have only poor to fair oil and gas source rock potential. S.L.

N83-11653# Texas Univ., Austin. Bureau of Economic Geology

GEOLOGIC STUDIES OF GEOPRESSURED AND HYDROPPRESSED ZONES IN TEXAS: TEST WELL SITE SELECTION Final Report, Jan. 1979 - May 1980

B. R. WEISE, M. B. EDWARDS, A. R. GREGORY, H. S. HAMLIN, L. A. JIRIK, and R. A. MORTON Sep. 1981 334 p refs (Contract GRI-5011-321-0125) (PB82-220542; GRI-80/0048) Avail: NTIS HC A15/MF A01 CSCL 081

Sites for test wells that will be capable of long term production of methane bearing water from the shallow geopressured and deep hydroppressed zones were identified. Test well site selection to obtain knowledge of shallow geopressured and deep hydroppressed aquifers included: (1) zones within the geopressured and deep hydroppressed section of the Texas Gulf Coast Tertiary were defined on the basis of pressure gradients and temperatures, (2) high sandstone corridors were identified for each of these zones; (3) five fairways, or areas of greatest net sandstone thickness, were located within the corridors, areas most prospective for testing entrained methane resources in the shallow geopressured and deep hydroppressed zones were identified in each fairway; (4) test sites were selected in four of the prospect areas. Data gained from these geologic studies and testing will be significant in the evaluation of the technical and economic feasibility of producing solution gas from the shallow geopressured and deep hydroppressed zones and comparison of these zones with deeper, hotter geopressured zones as sources of entrained methane. GRA

N83-12199# AeroChem Research Labs., Inc., Princeton, N. J. **SOOT FORMATION IN SYNFUELS Quarterly Report, 1 Apr. - 30 Jun. 1981**

D. B. OLSON Nov. 1981 22 p refs (Contract DE-AC22-80PC-30304) (DE82-004271; DOE/PC-30304/3; TN-22; QR-3) Avail: NTIS HC A02/MF A01

The effects of fuel molecular structure, flame temperature, and pressure on soot production in laboratory flames of selected synfuel component hydrocarbons are discussed. The threshold sooting index, flame temperature, and soot concentration in premixed and diffusion flames of approximately 50 fuel components were

04 FUELS AND OTHER SOURCES OF ENERGY

measured. A fuel vaporizer system was constructed, solving a significant problem in the emission pyrometer. Soot concentration measurements using a near IR light extinction technique were made. Experiments on a C₂H₂/O₂ flame to provide an absolute calibration for flame ion concentration measurements were done and modifications to the mass spectrometer system for sampling from high pressure flames were made. DOE

N83-12201# Department of Energy, Grand Forks, N. Dak. Energy Technology Center.

LIQUEFACTION BEHAVIOR OF AN AUSTRALIAN BROWN COAL IN COMPARISON TO THAT OF TWO US LIGNITES

G. G. BAKER, W. G. WILLSON, C. L. KNUDSON, S. A. FARNUM, and B. W. FARNUM Sep. 1982 35 p
(DE82-021977; DOE/GFETC/RI-82/2) Avail: NTIS HC A03/MF A01

Data presented in this report suggest the following major conclusions: (1) The Australian brown coal (predried to 10 pct moisture), at the conditions tested, resulted in lower yields than any of the US lignites or subbituminous coals tested thus far. (2) Distillate yield from the Australian coal was increased by continuous process unit bottoms recycle operation with syngas although not increased to the same level observed for North Dakota or Texas lignites processed at similar conditions, but with hydrogen. (3) The Australian coal responded to changes in operating conditions in a manner similar to North Dakota lignites; however, the total conversion and yields were always less. (4) The Australian coal tested appears to have been deactivated during the drying process, which is known to happen to US lignites dried in the presence of air or inert gas. DOE

N83-12202# Department of Energy, Bartlesville, Okla. Energy Technology Center.

AUTOMATED PROBE MICRODISTILLATION/MASS SPECTROMETRY FOR THE ANALYSIS OF HIGH-MOLECULAR WEIGHT COMPOUNDS IN FOSSIL FUELS

S. E. SCHEPPELE, Q. G. GRINDSTAFF, R. D. GRIGSBY, K. C. CHUNG, C. S. HWANG, T. D. MARRIOTT, and L. R. SCHRONK Aug. 1982 24 p refs
(PB82-022039; DOE/BETC/TPR-82/1) Avail: NTIS HC A02/MF A01

Automated probe microdistillation/mass spectroscopy is described. The application of computer hardware and the development of computer software eliminate the dilatory nature of acquiring both the temperature and associated mass spectra and reduces the acquired data for processing. The interaction of various hardware components of the system as well as the associated software is described. DOE

N83-12204# National Coal Board, Leatherhead (England). Coal Utilization Research Lab.

FLUIDISED-BED COMBUSTION: COMBUSTION OF RUN-OF-MINE COAL IN A 12-INCH-DIAMETER PRESSURIZED FLUIDISED-BED COMBUSTOR

K. K. PILLAI, S. N. BARKER, and A. G. ROBERTS 1981 76 p refs
(Contract DE-AC21-80MC-14129)
(DE82-018786; DOE/MC-14129/1208) Avail: NTIS HC A05/MF A01

Direct feeding of run-of-mine coal into a pressurized-fluidized bed combustor was performed at the Coal Utilization Research Laboratory, Leatherhead, United Kingdom (U.K.). A twelve-inch diameter rig was operated at 6 atmosphere pressure and 16500 F for a period of eighteen hours. Two coals were used, i.e., a U.K. washed coal for initial proving tests and a Pittsburgh No. 8 coal, both sized one inch to zero. Results were encouraging and are presented. DOE

N83-12207# National Bureau of Standards, Washington, D.C. Chemical Thermodynamics Div.

THERMODYNAMIC DATA FOR DESULFURIZATION PROCESSES Final Report

V. B. PARKER, B. R. STAPLES, T. L. JOBE, JR., and D. B. NEUMANN Sep. 1981 92 p refs
(Contract DE-AI21-80-MC14004)
(PB82-184904; NBSIR-81-2345) Avail: NTIS HC A05/MF A01 CSCL 07D

Values of thermochemical properties and processes at 298.15 K for flue gas desulfurization are presented. The substances covered are: (1) the aqueous ions: OH(-), SO₃(-2), HSO₃(-1), SO₄(-4), CO₃(-2), HCO₃(-), H(+), Mn(+2), Fe(+2), Mg(+2), Ca(+2), Na(+), and K(+), and (2) solid, liquid, aqueous, and gaseous compounds or species formed from these ions. The tables contain the following: the thermochemical property values, enthalpy of formation, delta sub f H deg Gibbs energy of formation, delta sub f G deg, entropy, S deg, and heat capacity, C sub P deg all at 298.15 K, as well as the enthalpy difference between 298.15 K and 0 K, H deg H sub 0 deg for the basic species are presented. The predicted values for delta H deg, delta G deg, and delta S deg as well as log K (equilibrium constant) for the processes, or reactions, are also presented. The property values, theta sub L, the relative apparent molar enthalpy, gamma(+), from the mean ionic activity coefficient, and theta, the osmotic coefficient, for binary aqueous systems at 298.15 K, all as a function of concentration are included. GRA

N83-12208# Rice Univ., Houston, Tex. GA730486

PHASE EQUILIBRIUM STUDIES FOR METHANE/SYNTHESIS GAS SEPARATION: THE HYDROGEN-CARBON MONOXIDE-METHANE SYSTEM

J. H. HONG and R. KOBAYASHI Apr. 1982 34 p refs
(PB82-200637; GRI-79/0113; RR-55) Avail: NTIS HC A03/MF A01 CSCL 07D

Vapor liquid equilibria for hydrogen-carbon monoxide-methane ternary system and associated binaries were investigated. The composite data are of particular benefit to the supplemental gas industry, wherein the separation of product methane from recycle gas is of major importance. A reliable data base from which accurate equilibria prediction models may be developed is presented. GRA

N83-12246*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

ANTIMISTING KEROSENE ATOMIZATION AND FLAMMABILITY

R. FLEETER, R. A. PETERSEN, R. D. TOAZ, A. JAKUB, and V. SAROHA Jul. 1982 182 p refs
(Contract FA-03-80-A-00215)
(NASA-CR-169385; NAS 1.26:169385; JPL-PUB-82-40; DOT/FAA-CT-82-19; AD-A120671) Avail: NTIS HC A09/MF A01

Various parameters found to affect the flammability of antimisting kerosene (Jet A + polymer additive) are investigated. Digital image processing was integrated into a technique for measurement of fuel spray characteristics. This technique was developed to avoid many of the error sources inherent to other spray assessment techniques and was applied to the study of engine fuel nozzle atomization performance with Jet A and antimisting fuel. Aircraft accident fuel spill and ignition dynamics were modeled in a steady state simulator allowing flammability to be measured as a function of airspeed, fuel flow rate, fuel jet Reynolds number and polymer concentration. The digital imaging technique was employed to measure spray characteristics in this simulation and these results were related to flammability test results. Scaling relationships were investigated through correlation of experimental results with characteristic dimensions spanning more than two orders of magnitude. S.L.

04 FUELS AND OTHER SOURCES OF ENERGY

N83-12248*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

FRICTIONAL CHARACTERISTICS AND HEAT TRANSFER OF ANTIMISTING FUELS IN TUBES Final Report, Aug. 1980 - Sep. 1981

J. WAT and V. SAROHIA Aug. 1982 70 p refs
(Contract NAS7-100; DTFA03-80-A-00215)
(NASA-CR-169388; JPL-PUBL-82-53; NAS 1.26.169388;
FAA-CT-82-20) Avail: NTIS HC A04/MF A01

The modification in flow and heat transfer behavior caused by the presence of the antimisting polymer additive FM-9 in jet fuel was determined. The antimisting kerosene (AMK) skin friction versus Reynolds number, or Nusselt number versus Reynolds number behavior, can be divided into three regions: (1) Newtonian laminar region, (2) shear-thickening transition region, and (3) drag reduction turbulent region. At low flow rates, AMK has Newtonian behavior, i.e. constant viscosity. At a certain critical wall shear rate which depends on the fuel temperature and additive concentration, shear thickening occurs and causes a large increase in skin friction and heat transfer rates. In the third region, the skin friction and heat transfer rates drop rapidly and fall below the predicted Newtonian flow skin friction and heat transfer values; e.g., for 0.3 percent FM-9 AMK at a temperature of 20 C, these values coincide with Newtonian values at solvent Reynolds number, equal to 2.2×10 to the 4th power and $1.0 \times$ to the 4th power. Beyond these points, there is a reduction in skin friction and heat transfer rates. Author

N83-12250*# Pennsylvania State Univ., University Park. Center for Air Environment Studies.

PERFORMANCE AND EMISSIONS CHARACTERISTICS OF AQUEOUS ALCOHOL FUMES IN A DI DIESEL ENGINE Final Report

J. B. HEISEY and S. S. LESTZ Aug. 1981 141 p refs
(Contract DE-AI01-81CS-50006; NAG3-91)
(NASA-CR-167917; DOE/NASA/0091-2; NAS 1.26.167917;
CAES-590-81) Avail: NTIS HC A07/MF A01 CSCL 21D

A single cylinder DI Diesel engine was fumigated with ethanol and methanol in amounts up to 55% of the total fuel energy. The effects of aqueous alcohol fumigation on engine thermal efficiency, combustion intensity and gaseous exhaust emissions were determined. Assessment of changes in the biological activity of raw particulate and its soluble organic fraction were also made using the Salmonella typhimurium test. Alcohol fumigation improved thermal efficiency slightly at moderate and heavy loads, but increased ignition delay at all operating conditions. Carbon monoxide and unburned hydrocarbon emission generally increased with alcohol fumigation and showed no dependence on alcohol type or quality. Oxide of nitrogen emission showed a strong dependence on alcohol quality; relative emission levels decreased with increasing water content of the fumigant. Particulate mass loading rates were lower for ethanol fueled conditions. However, the biological activity of both the raw particulate and its soluble organic fraction was enhanced by ethanol fumigation at most operating conditions. S.L.

N83-12252# Battelle Columbus Labs., Ohio.
ANALYTICAL TECHNIQUES FOR AROMATIC COMPONENTS IN AIRCRAFT FUELS Final Technical Report, 15 Jun. 1978 - 30 Sep. 1981

J. S. WARNER, T. H. DANISON, and J. S. MCNULTY Wright-Patterson AFB, Ohio AFWAL May 1982 155 p refs
(Contract F33615-78-C-2019; AF PROJ. 3048)
(AD-A118838; AFWAL-TR-82-2015) Avail: NTIS HC A08/MF A01 CSCL 21D

An ultraviolet detector was shown to be highly satisfactory for the selective determination of aromatic components in jet fuels. The detector was operated at 208 nm and used with a fused silica capillary column gas chromatographic system. The detector gave a linear response in the range of interest and could detect individual benzenes and naphthalenes in jet fuels at levels down to 0.01% and 0.002% respectively. Nitrogen-containing compounds were determined by the use of an alkali flame detector, high

pressure liquid chromatography, and mass spectrometry

Author (GRA)

N83-12253# Argonne National Lab., Ill. Materials Science Div.
MATERIALS TECHNOLOGY FOR COAL-CONVERSION PROCESSES Progress Report, Apr. - Jun. 1981

W. A. ELLINGSON Sep 1981 49 p refs
(Contract W-31-109-ENG-38)
(DE82-004036; ANL/FE-81-53) Avail: NTIS HC A03/MF A01

Coal-slag/refractory interactions, ultrasonic erosion monitoring of metals, fluid acoustics, high temperature gaseous corrosion of metal alloys, and failure analysis were studied. Work on coal-slag/refractory interaction included the design of a gas fired rotating drum dynamic slag corrosion test furnace. Field tests on the high pressure loop (1 1/4 in. 321 SS piping) at the solvent refined coal liquefaction pilot plant were terminated because of excessive erosive wear (1.27 mm lost). Longitudinal and shear wave velocity measurements from room temperature to 5400 C were obtained on Types 304, 304L, 316, 347, and 410 stainless steels, Fe-2 1/4 Cr-1 Mo steel, Stellite 6B, Haynes metal, cold rolled steel, and cast stainless steel. Work on the fluid acoustic test loop included changing all seals at the flange joints and calibrating the volumetric flowmeter by using an ASME orifice plate installed in the test section. Agreement within 10% was achieved. The loop was cycled several dozen times over a wide range of flow rates. DOE

N83-12254# Argonne National Lab., Ill. Components Technology Div.

STATE-OF-THE-ART OF ACOUSTIC INSTRUMENTATION FOR COAL-CONVERSION PLANTS

A. C. RAPTIS and T. K. LAU (DOE) Oct. 1981 129 p refs
(Contract W-31-109-ENG-38)
(DE82-004037; ANL/FE-49628-TM04) Avail: NTIS HC A07/MF A01

The state-of-the-art in development of acoustic instruments for coal conversion plants is presented. The feasibility for flow and temperature measurement parameters of the Sonar Equation and environmental conditions like: (1) attenuation of sound in coal conversion media; (2) the noise background levels in coal conversion plants; and (3) acoustic transducer and other material characteristics need to meet the requirements of the hostile environment. The current state of development of the high temperature acoustic Doppler flowmeter, active acoustic cross correlation flowmeter, and the acoustic flow/nowflow indicator is emphasized. DOE

N83-12255# Mueller Associates, Inc., Baltimore, Md.
STATUS OF ALCOHOL-FUELS-UTILIZATION TECHNOLOGY FOR HIGHWAY TRANSPORTATION: A 1981 PERSPECTIVE. VOLUME 1. SPARK-IGNITION ENGINES

P. W. MCCALLUM and T. J. TIMBARIO May 1982 99 p refs
2 Vol.
(Contract DE-AC05-79CS-56051)
(DE82-020493; DOE/CS-56051/7) Avail: NTIS HC A05/MF A01

The technology(ies) of alcohol utilization in highway transportation is reviewed. The use of methanol, ethanol, and certain of their derivatives in vehicles powered by spark ignition engines is treated. The results of engine, vehicle, and fuels testing are summarized. Exhaust emissions, performance and fuel economy, vehicle drivability, fuel systems materials compatibility, engine and vehicle design, fuels characterization, and environmental considerations are discussed. Important properties of selected alcohols and alcohol-derived fuels are described. DOE

04 FUELS AND OTHER SOURCES OF ENERGY

N83-12256# Idaho Univ., Moscow.
GASIFICATION KINETICS FOR BIOMASS DECOMPOSITION
 Annual Report, Jul. 1980 - Jun. 1981
 G. M. SIMMONS, S. RAMACHANDRAN, and W. LEE Jul. 1981
 36 p refs
 (Contract GRI-5080-363-0306)
 (PB82-199043; GRI-81/0026) Avail: NTIS HC A03/MF A01
 CSCL 21D

An extensive literature review has been completed on the thermal decomposition of cellulose and wood. A possible reaction path has been proposed. Experimental decomposition experiments which determine the rate of gas formation, as opposed to weight loss, have identified at least two separate rate constants which are consistent with the suggestion of competing reactions. Future work will incorporate detailed modeling of transport processes to ascertain the limits and dependencies of reactor rates on heat and mass transfer. GRA

N83-12257# Joyce (T. J.) Associates, Fairfax, Va.
ASSESSMENT OF RESEARCH AND DEVELOPMENT NEEDS FOR METHANE FUELED ENGINE SYSTEMS Final Report, Aug. 1981 - Mar. 1982
 T. J. JOYCE Mar. 1982 187 p refs
 (Contract GRI-5081-310-0507)
 (PB82-199035) Avail: NTIS HC A09/MF A01 CSCL 21D

The most significant technical, economic and institutional problems which have limited the use of natural gas as a fuel for stationary and mobile engines were identified and a research and development plan which would, if successful, resolve them was prepared. Problem identification was carried out through a mail canvass of equipment suppliers, vehicle operators, gas utilities and government organizations plus personal interviews with a number of the respondents. Research and development programs to develop improved equipment for use of compressed natural gas and liquefied natural gas as a vehicle fuel were reviewed. GRA

N83-12390# Wyoming Univ., Laramie. Dept. of Mechanical Engineering.
DATA COLLECTION AND ANALYSIS FOR GEOTHERMAL RESEARCH Final Report
 J. NYDAHL, K. PELL, D. SENSER, G. TWITCHELL, and S. OWNBEY Aug. 1981 128 p refs Prepared for the Colorado Div. of Highways
 (PB82-185430; CDH-UW-R-81-11; FHWA-CO-81-11) Avail: NTIS HC A07/MF A01 CSCL 13B

A prototype bridge deck heating system that utilizes heat pipes to transfer the energy between a warm water source and the deck surface was tested for possible use on some of the I-70 structures through the geothermally active Glenwood Canyon. At water flow rates around 35 GPM and temperatures of 25 C, the snow cover duration on the 59 sq m of heated surface was reduced between 96% and 100% and the deck's frozen time was reduced between 85% and 95% for the five different heat pipe configurations tested; this despite the fact that over a 1 1/4 thick sludge was deposited on all the unprotected metallic surfaces exposed to the geothermal water which caused the system's thermal resistance to double. If this system is to be viable for this application, a durable, protective coating with a low thermal resistance must be found to prevent both fouling and corrosion. The thermal analysis indicates that up to two hundred of these units can be placed in series with a tolerable degradation in the last unit's performance for water flow rates above 100 GPM. GRA

N83-12440# Energy and Environmental Analysis, Inc., Arlington, Va.
ASSESSMENT OF CURRENT AND PROJECTED FUTURE TRENDS IN LIGHT-DUTY-VEHICLE FUEL SWITCHING.
SUBTASK 1
 Jun. 1982 49 p refs
 (Contract DE-AC01-78PE-70045)
 (DE82-018816; DOE/PE/70045-T3) Avail: NTIS HC A03/MF A01

Trends in fuel switching by motorists during the period 1978 through 1981 were assessed with the use of two data bases of monthly household purchases of gasoline. Fuel switching was defined as either misfueling - the use of leaded gasoline in cars that require unleaded fuel - or discretionary switching - the use of unleaded gasoline in cars which can operate on leaded fuel. To identify disaggregated patterns of fuel switching, the data were stratified by year, season, census region, type of service station outlet, vehicle category and vintage. In addition, the relationship of trends in misfueling rates to changes in the relative prices of unleaded and leaded gasoline also were examined. Drawing upon the analysis of current data, three alternative future trends in misfueling rates by vehicle vintage were constructed. The impact of each of these cases on projections of the market share of leaded gasoline was examined with the aid of a previously developed model of highway fuel demand. DOE

N83-12480# Department of Energy, Washington, D. C. Office of Basic Energy Sciences.
SUMMARY OUTLINE OF DOE GEOSCIENCE AND GEOSCIENCE RELATED RESEARCH
 Feb. 1982 110 p
 (DE82-008203; DOE/ER-0120) Avail: NTIS HC A06/MF A01

The long range, basic research in the areas of the geosciences relevant to the nation's energy needs are discussed. The geoscience program develops a quantitative and predictive understanding of geological, geophysical and geochemical structures and processes in the solid earth and in solar terrestrial relationships. An effective knowledge base for energy resource recognition, evaluation and utilization in an environmentally acceptable manner is proposed. Principal areas of interest include: geology, geophysics, and Earth dynamics; geochemistry; energy resource recognition, evaluation and utilization; hydrologic and marine sciences and solar terrestrial/atmospheric interactions. DOE

N83-12541# Geothermal Power Corp., Novato, Calif
GEOTHERMAL RESERVOIR ASSESSMENT, ROOSEVELT HOT SPRINGS Final Report, 1 Oct. 1977 - 30 Jun. 1982
 1982 81 p refs
 (Contract DE-AC08-77ET-28406)
 (DE82-020632; DOE/ET-28406/1) Avail: NTIS HC A05/MF A01

The geology, geophysics, and geothermal potential of the northern Mineral Mountains, located in Beaver and Millard Counties, Utah, are studied. More specifically, the commercial geothermal potential of lease holdings of the Geothermal Power Corporation is addressed. DOE

N83-12571# California Univ., Livermore. Lawrence Livermore Lab.
FLUIDIZED-BED PYROLYSIS OF OIL SHALE: OIL YIELD, COMPOSITION, AND KINETICS
 J. H. RICHARDSON, E. B. HUSS, L. L. OTT, J. E. CLARKSON, M. O. BISHOP, J. R. TAYLOR, L. J. GREGORY, and C. J. MORRIS Sep 1982 72 p refs
 (Contract W-7405-ENG-48)
 (DE82-021010; UCID-19548) Avail: NTIS HC A04/MF A01

A quartz isothermal fluidized bed reactor was used to measure kinetics and oil properties relevant to surface processing of oil shale. The rate of oil formation was described with two sequential first order rate equations characterized by two rate constants. These rate constants together with an expression for the appropriate weighting coefficients describe approximately 97% of the total oil produced. The results of different attempts to

04 FUELS AND OTHER SOURCES OF ENERGY

mathematically describe the data in a manner suitable for modeling applications are related. Preliminary results for species selective kinetics of methane, ethene, ethane and hydrogen, where the latter is clearly distinguished as the product of a distinct intermediate are also presented. Oil yields from Western oil shale are approximately 100% Fischer assay. Oil composition is based on previous work and the higher heating rates inherent in fluidized pyrolysis. Neither the oil yield, composition nor the kinetics varied with particle size between 0.2 and 2.0 mm within experimental error. The qualitatively expected change in oil composition due to cracking was observed over the temperature range studied. Eastern shale exhibited significantly faster kinetics and higher oil yields than did Western shale. DOE

N83-12584# Nevada Univ., Reno. Div. of Earth Sciences. **LOW- TO MODERATE-TEMPERATURE GEOTHERMAL RESOURCE ASSESSMENT FOR NEVADA: AREA SPECIFIC STUDIES, PUMPERNICKEL VALLEY, CARLIN AND MOANA Final Report, 1 Jun. 1981 - 31 Jul. 1982**
D. T. TREXLER, T. FLYNN, B. A. KOENIG, E. J. BELL, and G. CHUSN, JR. 1982 197 p refs
(Contract DE-AC08-81NV-10220)
(DE82-018598; DOE/NV-10220/1) Avail: NTIS HC A09/MF A01

Geological, geophysical and geochemical surveys were used in conjunction with temperature gradient hole drilling to assess the geothermal resources in Pumphernickel Valley and Carlin, Nevada. A statewide assessment of geothermal resources that was completed in 1979 was used. The exploration techniques are based on previous federally-funded assessment programs that were completed in 19 other areas in Nevada and include: literature search and compilation of existing data, geologic reconnaissance, chemical sampling of thermal and non-thermal fluids, interpretation of satellite imagery, interpretation of low-sun angle aerial photographs, two-meter depth temperature probe survey, gravity survey, seismic survey, soil-mercury survey, and temperature gradient drilling. DOE

N83-12667# Acurex Corp., Mountain View, Calif. Energy and Environmental Div
MEASUREMENT OF HIGH-TEMPERATURE HIGH-PRESSURE PROCESSES: A SUMMARY REPORT Final Report, Sep. 1975 - Sep. 1979
L. COOPER and M. SHACKLETON Mar. 1982 135 p refs
(Contract EPA-68-02-2153)
(PB82-196932; EPA-600/7-82-009; ORD-79-353) Avail: NTIS HC A07/MF A01 CSCL 13B

An assessment and development of technology required to perform high-temperature high-pressure (HTHP) particulate sampling is summarized. In addition to efforts devoted to developing and testing an HTHP sampler for the EPA/Exxon Miniplant, experience was gained in the design aspects of HTHP sampling equipment and testing procedures. This experience is highlighted. A background study and planning effort was directed toward possible future sampling efforts in a coal gasification plant. A state-of-the-art review of HTHP sampling was also performed. To document the materials collected, a bibliography of articles, reports, and books relating to HTHP sampling was compiled. A list of persons interested in this technology is also included. Results demonstrated that particle size distribution and samples suitable for chemical analysis can be obtained with the apparatus described in the report. Author (GRA)

N83-12704# Texas Univ., Austin. Electrical Geophysics Research Lab

A MULTI-SITE MAGNETOTELLURIC MEASUREMENT SYSTEM WITH REAL-TIME DATA ANALYSIS Final Technical Report
J. D. BECKER, F. X. BOSTICK, and H. W. SMITH Sep. 1981 189 p refs
(Contract DE-AS05-77ET-28341)
(DE82-020596; DOE/ET-28341/T1) Avail: NTIS HC A09/MF A01

A magnetotelluric measurement system was designed to provide a more cost effective electrical method for geothermal and mineral exploration. The theoretical requirements and sensitivities of the magnetotelluric inversion process were specifically addressed in determining system performance requirements. Remotely located, battery powered, instrumentation packages return data to a central controlling site through a 2560 baud wire-line or radio link. Each remote package contains preamplifiers, data conditioning filters, and a 12 bit gain ranging A-D converter for frequencies from 0.001 Hz to 8 Hz. Data frequencies above 8 Hz are processed sequentially by a heterodyne receiver to reduce bandwidth to within the limits of the 2560 baud data link. The central data collection site provides overall control for the entire system. Data from the remote packages may be recorded in time sequence on a magnetic tape cartridge system, or an optional Hewlett-Packard 21MX minicomputer can be used to perform real time frequency analysis. The results of this analysis provide feedback to the operator for improved evaluation of system performance and for selection of future measurement sites. GRA

N83-12706# Oak Ridge Associated Universities, Inc., Washington, D.C. Inst. for Energy Analysis.

GEOTHERMAL-RESOURCE SURVEY OF THE TENNESSEE VALLEY REGION
W. P. STAUB and N. L. TREAT Aug. 1982 133 p refs
(Contract DE-AC05-76OR-00033)
(DE82-021951, ORAU/IEA-82-7(M)) Avail: NTIS HC A07/MF A01

An overview appraisal of the geothermal resources in the Tennessee Valley Region revealed geothermal resources of potential usefulness in two of 13 subregions: the New Madrid Seismic Zone and the central segment of the Northern Gulf Coastal Plain. The appraisal was based on geologic features of the region (hot springs, groundwater aquifers, and structure) and temperature data for oil and gas wells and shallow water wells. Site specific exploration for economic appraisal was not carried out. The geothermal gradient for each of the subregions was established by linear regression of all of the bottom hole temperature data for the oil and gas wells. A routine statistical procedure identified all unusually warm wells within each subregion, and their locations were plotted. Hot spots in a subregion were identified by localized clustering of such wells in numbers exceeding statistical expectations based on the intensity of drilling activity. Of the two areas most likely for extraction of geothermal energy, the New Madrid Seismic Zone has a high geothermal gradient at shallow depths (less than 500 meters). DOE

N83-12751# Institut National de la Recherche Agronomique, Avignon (France). Dept. de Bioclimatologie.

STUDY OF GROUND WINDS IN UPPER VOLTA: ECONOMIC AND AGRONOMIC CONSEQUENCES FOR THE SUDAN-SAHIL REGION OF WEST AFRICA
C. BALDY, R. DELECOLLE (Direction de la Meteorologie, Upper Volta), and H. KONTONGOMDE In WMO Tech. Conf. on Climate: Africa p 325-332 1982 In FRENCH; ENGLISH summary
Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

Ground winds in the cold, dry season (December-January) and the wet season (July) in Upper Volta were analyzed. The utility of windbreaks, and wind energy conversion were studied. Wind velocity alone does not justify the construction of windbreaks, although they could protect crops from blown sand, or prevent water vapor exchange between the protected area and its environment. Winds are regular, with a marked velocity increase

04 FUELS AND OTHER SOURCES OF ENERGY

then decrease between 9 am and 5 pm. Even very gentle valleys can reduce wind velocity, so generators should be placed on hilltops, even though irrigation pumps are lower down.

Author (ESA)

N83-12754# National Weather Service, Silver Spring, Md. Hydrologic Services Div.

CLIMATIC ASPECTS OF PLANNING IMPOUNDMENTS AND HYDROPOWER OPERATIONS

J. C. SCHAAKE / In WMO Tech. Conf. on Climate: Africa p 360-374 1982 refs

Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

The representativeness of past experience of climate for prediction, the sensitivity of streamflow to climate variability, and the social and economic benefits deriving from design or operations decisions for given streamflow conditions are discussed. It is found that future periods exhibit climate conditions that vary from period to period, but these variations can be accounted for on the basis of historical experience augmented by regional analysis of this experience and the use of long term information such as might be found in dendroclimatic studies of tree rings. The representativeness of climate information for the short run requires research to develop quantitative methods. The effect of climate variability on streamflow can be accounted for with conceptual hydrology models, or with a generalized water balance model, or a drought index.

Author (ESA)

N83-12785# Pacific Northwest Lab., Richland, Wash. **CANDIDATE WIND-TURBINE-GENERATOR SITE: DATA SUMMARY Annual Report, Jan. - Dec. 1981**

W. F. SANDUSKY, J. W. BUCK, D. S. RENNE, D. L. HADLEY, and O. B. ABBEY Jul 1982 298 p refs

(Contract DE-AC06-76RLO-1830) (DE82-020416; PNL-4283) Avail: NTIS HC A13/MF A01

Summarized hourly meteorological data for 34 candidate and wind turbine generator sites for calendar year 1981 are presented. These data are collected for the purpose of evaluating the wind energy potential at these sites and are used to assist in selection of potential sites for installation and testing of large wind turbines in electric utility systems. For each site, wind speed, direction, and distribution data are given in eight tables. Use of information from these tables, with information about specific wind turbines, should allow the user to estimate the potential for wind energy production at each site.

DOE

N83-12788# Ottawa (Toru), Municipie, Ind. **DEVELOPMENT OF A SLIDE PROGRAM DESCRIBING A SITE SELECTION PROCESS FOR SMALL WIND-ENERGY-CONVERSION SYSTEMS (SWECS) Final Technical Report**

T. OTAWA May 1982 79 p refs

(Contract DE-FG02-81R-510301) (DE82-017394; DOE/R5-10301/1-FINAL) Avail: NTIS HC A05/MF A01

A slide program was developed primarily to promote a proper site-selection method for small wind energy conversion systems (SWECS). The technical background of the program development is discussed. The major issues involved in SWECS siting are: wind-resource assessment techniques, land-use constraints, potential hazards, potential environmental impact, site accessibility, and proximity to load location. These factors are incorporated into a method of site-screening to maximize energy output as well as to discourage the negative impact of SWECS siting on the environment. The method utilizes the technique of overlay mapping to analyze different relationships among various patterns of land characteristics. Transparent or semi-transparent maps depicting the patterns are overlaid to show a pattern of light and dark tones revealing areas of site potentials and limitations for SWECS placement. A case-study is conducted to demonstrate the site-selection method developed.

DOE

N83-13005# Tennessee Univ. Space Inst., Tullahoma. Energy Research and Development Center.

THREE-DIMENSIONAL CURRENT DISTRIBUTION IN COAL-FIRED MHD CHANNELS

M. ISHIKAWA, Y. C. L. WU, and M. H. SCOTT Jan. 1982 64 p refs

(Contract DE-AC02-79ET-10815) (DE82-016958; UTSI-81-6; DOE/ET-10015/70) Avail: NTIS HC A04/MF A01

Slagging effects on theoretical three dimensional current and potential distributions are presented for one frame of the UTSI 600DCW channel. The electrodynamic problem is solved with imposed gasdynamic and slag layer solutions. A three dimensional finite element method was applied to solve for the electrical potential. The location of current concentration calculated on anode sidebar wall coincides with wear patterns observed in experiments. The upper bound of slag layer leakage resistance was calculated. The effects of slag polarization on electrodes and the sidewall configuration on generator performance were investigated. Experimental data reveals that the polarization effect reduces about three percent of the overall electrical performance of the UTSI 600 Diagonal Conducting Wal (DCW) channel. The polarization effect results in a large change of the potential and current distributions near the frame but has a small effect on the overall electrical performance. Alternate sidewall/electrode configurations are considered analytically.

DOE

N83-13041# Weston (Roy F.), Inc., West Chester, Pa. **DEMONSTRATION OF SYNERGISTIC INDUSTRIAL ENERGY/MUNICIPAL SOLID WASTE DISPOSAL FACILITY**

Sep. 1981 164 p Prepared in cooperation with County of Delaware, Media, Pa. and Scott Paper Co., Chester 3 Vol. (Contract DE-FG01-79CS-20245)

(DE82-001145; DOE/CS-20245/2-VOL-1) Avail: NTIS HC A08/MF A01

The completion of Phase 1 of the Demonstration of Synergistic Industrial Energy/Municipal Solid Waste Disposal Facility is discussed. The opportunities available to recover material and energy resources from solid waste, both within and outside the County boundaries are discussed. The general engineering concepts necessary to achieve successful resource recovery are discussed. Preliminary cost estimates, technical evaluations, and economic analyses are presented. A recommendation for selecting specific resource recovery concepts is given, and a recommended work plan for the next phase of the study is presented.

DOE

N83-13089# National Telecommunications and Information Administration, Boulder, Colo. Institute for Telecommunication Sciences.

INSTRUMENT LANDING SYSTEM LOCALIZER RECEIVER PERFORMANCE IN THE PRESENCE OF CO-CHANNEL INTERFERENCE Final Report

E. J. HAAKINSON Jul. 1982 51 p

(Contract DT-FA01-81-Y-10534) (AD-A118909; DOT/FAA/RD-82/43) Avail: NTIS HC A04/MF A01 CSCL 17G

Co-channel signals can cause harmful interference to navigational aid systems such as the Instrument Landing System. This report describes the performance of four localizer receivers in the presence of interference from co-channel CW (Continuous Wave), PSK (Phase Shift Keying), FSK (Frequency Shift Keying), and FM (Frequency Modulation) signals. The receiver parameters monitored during the measurements were course deviation voltage, warning flag voltage, AGC (Automatic Gain Control) voltage, and audio distortion. Measurement results are reported as the minimum signal-to-interference ratio required to keep each monitored parameter from exceeding specified bounds. Course deviation voltage is the most sensitive parameter to the co-channel interference.

GRA

04 FUELS AND OTHER SOURCES OF ENERGY

N83-13197# Brookhaven National Lab., Upton, N. Y. FLASH HYDROLYSIS OF COAL FOR CONVERSION TO LIQUID AND GASEOUS FUELS

M. S. SUNDARAM, M. STEINBERG, and P. T. FALLON May 1982 97 p refs

(Contract DE-AC02-76CH-00016)

(DE82-019435; DOE/METC-82-48) Avail: NTIS HC A05/MF A01

Process chemistry and design information for production of both liquid and gaseous fuels from coal was obtained. In particular, the products and correlation of the product yields as a function of pressure, temperature, and coal residence time in the flash hydrolyzer, was performed, and then this information was combined with the kinetic data to develop a reaction model. A parametric study of the flash hydrolysis was made with different coal types. Appropriate reactor conditions for maximizing either liquid or gaseous products were determined. The components in the heavier liquids were identified, and nitrogen and sulfur balances were made on the coal, the char products, and both the liquid and the gaseous effluents. From a detailed analysis of data, a reaction scheme for the flash hydrolysis of coal was proposed, for which reaction rate constants were determined and a kinetic model was developed. This information was applied to a conceptual full scale process design, and comparative economic estimates were made. The results indicate that the coals tested can be successfully converted to produce clean gaseous and liquid fuels via flash hydrolysis. Two features of this process - its being noncatalytic and its using direct hydrogenation in one step to liquid distillates - tend to improve the efficiency and reduce capital and operating costs. The process can be made to produce either gaseous or liquid fuels, or both, by adjusting the reactor and process design conditions. DOE

N83-13240# Oak Ridge National Lab., Tenn. STRESS-CORROSION STUDIES IN COAL-LIQUEFACTION ENVIRONMENTS

V. B. BAYLOR, J. R. KEISER, and J. H. DEVAN 1981 10 p refs Presented at the 6th Ann. Conf. on Materials for Coal Conversion and Utilization, Gaithersburg, Md., 13 Oct. 1981 (Contract W-7404-ENG-26)

(DE82-001464; CONF-811061-1) Avail: NTIS HC A02/MF A01

Over 300 U bend specimens from all four coal liquefaction pilot plants were examined by determining corrosion rates as well as by visual and metallographic analysis. Sulfur containing acids were studied. Results from U bend exposures in coal liquefaction pilot plants show that in the reactor and separator areas general corrosion and possibly some cracking of low alloy steels, sulfidation of nickel base alloys, cracking of some austenitic steels and generally good performance of stabilized austenitic, high alloy austenitic, duplex, ferritic austenitic, and ferritic stainless steels takes place. In the fractionation area extensive general corrosion and pitting of low alloy and stainless steels was found, with corrosion performance improving with higher nickel alloys (as with alloy 825). DOE

N83-13272*# Pennsylvania State Univ., University Park. Center for Air Environment Studies FUMIGATION OF ALCOHOL IN A LIGHT DUTY AUTOMOTIVE DIESEL ENGINE Final Report

E. M. H. BROUKHIYAN and S. S. LESTZ Aug. 1981 121 p refs

(Contract NAG3-91; DE-AI01-81CS-50006)

(NASA-CR-167915; DOE/NASA/0091-1; NAS 1.26:167915;

CAES-600-81) Avail: NTIS HC A06/MF A01 CSCL 21D

A light-duty automotive Diesel engine was fumigated with methanol in amounts up to 35% and 50% of the total fuel energy respectively in order to determine the effect of alcohol fumigation on engine performance at various operating conditions. Engine fuel efficiency, emissions, smoke, and the occurrence of severe knock were the parameters used to evaluate performance. Raw exhaust particulate and its soluble organic extract were screened for biological activity using the Ames Salmonella typhimurium assay. Results are given for a test matrix made up of twelve steady-state

operating conditions. For all conditions except the 1/4 rack (light load) condition, modest thermal efficiency gains were noted upon ethanol fumigation. Methanol showed the same increase at 3/4 and full rack (high load) conditions. However, engine roughness or the occurrence of severe knock limited the maximum amount of alcohol that could be fumigated. Brake specific nitrogen oxide concentrations were found to decrease for all ethanol conditions tested. Oxides of nitrogen emissions, on a volume basis, decreased for all alcohol conditions tested. Based on the limited particulate data analyzed, it appears that ethanol fumigation, like methanol fumigation, while lowering the mass of particulate emitted, does enhance the biological activity of that particulate. Author

N83-13277# Wisconsin Univ., Madison ALCOHOL AS A FUEL FOR FARM AND CONSTRUCTION EQUIPMENT

G. L. BORMAN, D. E. FOSTER, P. S. MEYERS, O. A. UYEHARA, J. CHEN, X. GAO, and Z. YE Jun. 1982 33 p refs

(Contract DE-AC02-79CS-50025)

(DE82-021022, DOE/CS-50025/2) Avail: NTIS HC A03/MF A01

Work in three areas dealing with the utilization of ethanol as fuel for farm and construction diesels is summarized. What is known about the retrofitting of diesels for use of ethanol and the combustion problems involved is reviewed. The performance of a single cylinder, open chamber diesel using solutions and emulsions of diesel fuel with ethanol is described. Data taken include performance, emissions and cylinder pressure-time for diesel fuel with zero to forty percent ethanol by volume. Analysis of the data includes calculation of heat release rates using a single zone model. An investigation into retrofitting a multicylinder turbocharged farm tractor diesel to use ethanol by fumigation is discussed. Three methods of ethanol introduction are discussed; spraying ethanol upstream and downstream of the compressor and prevaporization of the ethanol. Data on performance and emissions are given for the last two methods. A three zone heat release model is described and results from the model are given. A correlation of the ignition delay using prevaporized ethanol fumigation data is also given. Comparisons are made between fumigation in DI and IDI engines. DOE

N83-13279# TRW, Inc., Redondo Beach, Calif. Environmental Div

A COMPENDIUM OF SYN FUEL END USE TESTING PROGRAMS Final Report, Mar. - Sep. 1981

M. GHASSEMI, S. QUINLIVAN, and M. HARO May 1982 237 p refs

(Contract EPA-68-02-3174)

(PB82-236936, EPA-600/7-82-035) Avail: NTIS HC A11/MF A01 CSCL 07A

Information on major, recently completed, current, and planned synfuel end-use testing projects is given. It is intended to promote the flow of information between synfuel testing programs, thereby reducing the duplication of effort and enabling design and implementation of cost-effective and systematic approaches to the collection of appropriate environmental data in conjunction with on-going and planned performance testing projects. Projects described in the compendium include testing of shale-derived fuels, middle distillates, coal liquids, and methanol/indolene mixtures in such equipment as utility boilers, steam generators, diesel engines (laboratory and full scale), auto engines, and other combustors. GRA

04 FUELS AND OTHER SOURCES OF ENERGY

N83-13280# Radian Corp., McLean, Va.
SOURCE TEST AND EVALUATION REPORT: ALCOHOL FACILITY FOR GASOHOL PRODUCTION Final Report, Oct. 1979 - Feb. 1980

R. M. SCARBERRY, M. P. PAPAI, P. E. MILLS, and T. J. POWERS, III Apr. 1982 199 p refs
 (Contract EPA-68-02-2667)
 (PB82-237041, EPA-600/7-82-018) Avail: NTIS HC A09/MF A01 CSDL 07A

The requirements for environmental sampling and analysis of alcohol-producing facilities capable of supporting a gasohol industry are defined and these requirements are applied to the environmental characterization of an alcohol plant. A conceptual design of a grain alcohol plant using a coal-fired boiler that is projected to be typical of future plants which will support a Gasohol industry is given. Environmental control options are also discussed based on a comparison of alcohol plant stream compositions with environmental regulations. The results of this study provide preliminary information on the environmental consequences of large-scale fermentation ethanol plants which will provide alcohol for gasohol. GRA

N83-13281# Southwest Research Inst., San Antonio, Tex.
CHARACTERIZATION OF DIESEL EMISSIONS FROM OPERATION OF A LIGHT-DUTY DIESEL VEHICLE ON ALTERNATE SOURCE DIESEL FUELS

B. B. BYKOWSKI Nov. 1981 74 p refs
 (Contract EPA-68-03-2884)
 (PB82-232448; EPA-460/3-82-002) Avail: NTIS HC A04/MF A01 CSDL 21D

Emission evaluations of several alternate-source fuels in a 1980 Volkswagen Rabbit Diesel are described. Fuels tested included a no. 2 petroleum diesel as base, base plus coal derived liquids, shale oil diesel fuel and jet fuel, and a blend of petroleum blend stocks with coal and shale liquids. Nine fuels were investigated including the base fuel. GRA

N83-13282# Southwest Research Inst., San Antonio, Tex.
CHARACTERIZATION OF DIESEL EMISSIONS FROM OPERATION OF A LIGHT-DUTY DIESEL VEHICLE ON ALTERNATE SOURCE DIESEL FUELS Final Report, Jun. 1980 - Oct. 1981

B. B. BYKOWSKI Nov. 1981 190 p refs
 (Contract EPA-68-03-2884)
 (PB82-234147; EPA-460/3-82-002) Avail: NTIS HC A09/MF A01 CSDL 21D

Alternate source diesel test fuels and their effects on regulated and unregulated exhaust emissions from a 1980 Volkswagen Rabbit were examined. Nine fuel blends were tested: a no. 2 petroleum diesel as base, base plus coal derived liquids, shale oil diesel and jet fuel, and other blends of coal derived liquids, shale oil liquids, and petroleum stocks. Analyses performed include gaseous hydrocarbons, CO, NOx, particulate mass, phenols, smoke, odor, Ames tests, BaP, and polarity by HPLC. Smoke and particulate increases are generally associated with use of coal derived liquids. GRA

N83-13283# Gulf South Research Inst., New Orleans, La.
COMPONENTS IDENTIFIED IN ENERGY-RELATED WASTES AND EFFLUENTS Final Report, Nov. 1976 - Nov. 1979

J. E. GEBHART and M. M. MCKOWN May 1982 734 p refs
 (Contract EPA-68-03-2487)
 (PB82-236985; EPA-600/3-82-058) Avail: NTIS HC A99/MF A01 CSDL 21D

A state-of-the-art review of the characterization of solid wastes and aqueous effluents generated by energy-related processes was conducted. The reliability of these data was evaluated according to preselected criteria of sample source, sampling and analytical methodology, and data source. Data on the following activities were included: coal strip mining, oil refineries, oil shale operations, coal-fired power plants, coal liquefaction processes, coal gasification processes, and geothermal energy production. Using the information collected, areas of inadequate data were identified

and sampling sites were selected. Sites were selected to include at least one plant in each of seven energy-related activities. Absorption spectroscopy and mass spectroscopy were employed.

Author (GRA)

N83-13284# Texas Engineering Experiment Station, College Station.

BASIC RESEARCH OPPORTUNITIES FOR LASTING FUEL GAS SUPPLIES FROM INORGANIC RESOURCES. REPORT OF A WORKSHOP COLLEGE STATION, 8 JUN. - 14 AUG. 1981 Final Report, 15 Feb. 1981 - 28 Feb. 1982

K. J. IRGOLIC, ed. 28 Feb. 1982 335 p refs Workshop held at College Station, Tex., 8 Jun. - 14 Aug. 1981
 (Contract GRI-5081-360-0435)

(PB82-231671, GRI-81/0024) Avail: NTIS HC A15/MF A01 CSDL 21D

The production of fuel gases from inorganic resources using indefinitely sustainable energy sources were studied. Photobiological, biomimetic, photochemical, photoelectrochemical, radiolytic and thermochemical pathways leading to the generation of hydrogen from water and hydrogen sulfide, of carbon monoxide and methane from carbon dioxide, and of nitrogen-based fuel gases from atmospheric nitrogen were assessed. The most likely energy sources to drive the endergonic, fuel-producing reactions are solar radiation, and heat and radiation from nuclear reactors. GRA

N83-13378# Vereinigte Elektrizitaetswerke Westfalen A G., Dortmund (West Germany). Hauptbereich Maschinenentech.

BASIC ENGINEERING OF A 10 T/HR PROTOTYPE PLANT FOR THE VEREINIGTE ELEKTRIZITAETSWERKE WESTFALEN (VEW) COAL CONVERSION PROCESS Final Report, Nov. 1981

K. WEINZIERI, D. DEGGIM, J. POLLER, and R. KARGER Bonn Bundesministerium fuer Forschung und Technologie Aug. 1982 111 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-T-82-114; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 23,50

A coal conversion process and prototype plants are described. The prototype plant consists of the gasification unit with coal milling and drying, the coal feeding, the waste heat recovery and gas/char separation unit and the gas cleaning unit with the gas cooling, the H2S removal, and the evaporation and sulfur production units.

Author (ESA)

N83-13464# Curtiss-Wright Corp., Wood-Ridge, N.J. Power Systems Div.

HIGH-TEMPERATURE-TURBINE-TECHNOLOGY PROGRAM. PHASE 2: TECHNOLOGY TEST AND SUPPORT STUDIES. TURBINE SPOOL TECHNOLOGY RIG FUEL-CONTAMINANT TOLERANCE TEST

Apr. 1982 105 p
 (Contract DE-AC01-76ET-10348)

(DE82-020287; CW-WR-76-020.98A; FE-2291-98A) Avail: NTIS HC A06/MF A01

The durability of high temperature transpiration air cooled turbine blading under increasingly severe conditions simulating the combustion of coal derived was investigated. The test equipment, procedures and results are described. The high pressure ratio and mass flow of the TSTR produced turbine section particulate loading about twice that of the LP rig engine. The durability of this new transpiration air cooled blading to be comparable to that of the LP rig engine is shown. DOE

04 FUELS AND OTHER SOURCES OF ENERGY

N83-13552# Bendix Field Engineering Corp., Grand Junction, Colo.

HYDROGEOCHEMICAL AND STREAM-SEDIMENT RECONNAISSANCE BASIC DATA FOR UTICA QUADRANGLE, NEW YORK. URANIUM RESOURCE EVALUATION PROJECT

7 Jun. 1982 95 p Prepared in cooperation with Oak Ridge Gaseous Diffusion Plant
(Contract DE-AC13-76GJ-01664, W-7405-ENG-26)
(DE82-020429; GJBX-85-82; K/UR-440) Avail: NTIS HC A05/MF A01

Hydrogeochemical data which were compiled for stream sediment reconnaissance of Utica quadrangle in New York are presented. DOE

N83-13553# Bendix Field Engineering Corp., Grand Junction, Colo.

HYDROGEOCHEMICAL AND STREAM-SEDIMENT RECONNAISSANCE BASIC DATA FOR MARION, CANTON, PITTSBURGH AND CLEVELAND QUADRANGLES, OHIO; WEST VIRGINIA; PENNSYLVANIA. URANIUM RESOURCE EVALUATION PROJECT

7 Jun. 1982 61 p Prepared in cooperation with Oak Ridge Gaseous Diffusion Plant
(Contract DE-AC13-76GJ-01664; W-7405-ENG-26)
(DE82-020430; GJBX-80-82; K/UR-435) Avail: NTIS HC A04/MF A01

Data were compiled for the hydrogeochemical and stream sediment reconnaissance of Marion, Canton, Pittsburgh, and Cleveland quadrangles of Ohio, West Virginia, and Pennsylvania. DOE

N83-13554# Bendix Field Engineering Corp., Grand Junction, Colo.

HYDROGEOCHEMICAL AND STREAM-SEDIMENT RECONNAISSANCE BASIC DATA FOR BEAUMONT, LAKE CHARLES AND BATON ROUGE QUADRANGLES, TEXAS; LOUISIANA. URANIUM RESOURCE EVALUATION PROJECT

7 Jun. 1982 21 p Prepared in cooperation with Oak Ridge Gaseous Diffusion Plant
(Contract DE-AC13-76GJ-01664; W-7405-ENG-26)
(DE82-020438; GJBX-66-82; K/UR-421) Avail: NTIS HC A02/MF A01

Hydrogeochemical data were compiled for stream sediment reconnaissance of Beaumont, Lake Charles, and Baton Rouge quadrangles in Texas and Louisiana. DOE

N83-13557# Bendix Field Engineering Corp., Grand Junction, Colo.

HYDROGEOCHEMICAL AND STREAM-SEDIMENT RECONNAISSANCE BASIC DATA FOR OGDENSBURG AND LAKE CHAMPLAIN QUADRANGLES, NEW YORK; VERMONT. URANIUM RESOURCE EVALUATION PROJECT

9 Jun. 1982 75 p Prepared in cooperation with Oak Ridge Gaseous Diffusion Plant
(Contract DE-AC13-76GJ-01664; W-7405-ENG-26)
(DE82-020417; GJBX-87-82; K/UR-442) Avail: NTIS HC A04/MF A01

Hydrogeochemical data which were compiled for stream sediment reconnaissance of Ogdensburg and Lake Champlain quadrangles in New York and Vermont are presented. DOE

N83-13558# Bendix Field Engineering Corp., Grand Junction, Colo.

HYDROGEOCHEMICAL AND STREAM-SEDIMENT RECONNAISSANCE BASIC DATA FOR JENKINS QUADRANGLE, KENTUCKY; VIRGINIA; WEST VIRGINIA. URANIUM RESOURCE EVALUATION PROJECT

3 Jun. 1982 96 p
(Contract DE-AC13-76GJ-01664; W-7405-ENG-26)
(DE82-020431; GJBX-78-82; K/UR-433) Avail: NTIS HC A05/MF A01

Hydrogeochemical data which were compiled for the stream

sediment reconnaissance of Virginia, West Virginia, and Jenkins Quadrangle in Kentucky are presented. DOE

N83-13559# Bendix Field Engineering Corp., Grand Junction, Colo.

HYDROGEOCHEMICAL AND STREAM-SEDIMENT RECONNAISSANCE BASIC DATA FOR SHERMAN, TAXARKANA, EL DORADO, AND GREENWOOD QUADRANGLES, OKLAHOMA; TEXAS; ARKANSAS; MISSISSIPPI

9 Jun. 1982 95 p
(Contract DE-AC13-76GJ-01664; W-7405-ENG-26)
(DE82-020436; GJBX-69-82; K/UR-424) Avail: NTIS HC A05/MF A01

Data which were compiled for the hydrogeochemical and stream-sediment reconnaissance of Sherman, Texarkana, El Dorado, and Greenwood quadrangles in Oklahoma, Texas, Arkansas, and Mississippi are presented. DOE

N83-13588*# General Electric Co., Schenectady, N. Y.
EVALUATION OF CATALYTIC COMBUSTION OF ACTUAL COAL-DERIVED GAS Final Report

J. C. BLANTON and R. A. SHISLER Feb. 1982 54 p refs
(Contract NAS3-22818, DE-AI01-77ET-10350)
(NASA-CR-167842; DOE/NASA-2818-1; NAS 1.26:167842; SRD-82-023) Avail: NTIS HC A04/MF A01 CSCL 21B

The combustion characteristics of a Pt-Pt catalytic reactor burning coal-derived, low-Btu gas were investigated. A large matrix of test conditions was explored involving variations in fuel/air inlet temperature and velocity, reactor pressure, and combustor exit temperature. Other data recorded included fuel gas composition, reactor temperatures, and exhaust emissions. Operating experience with the reactor was satisfactory. Combustion efficiencies were quite high (over 95 percent) over most of the operating range. Emissions of NO_x were quite high (up to 500 ppm V and greater), owing to the high ammonia content of the fuel gas. Author

N83-13601# Battelle Columbus Labs., Ohio.
CONVERSION OF FOREST RESIDUES TO A METHANE-RICH GAS IN A HIGH-THROUGHPUT GASIFIER

H. F. FELDMAN, M. A. PAISLEY, D. W. FOLSOM, and B. C. KIM 31 Oct. 1981 60 p refs
(Contract W-7405-ENG-92)
(DE82-020289; BMI-2907) Avail: NTIS HC A04/MF A01

Results of the experimental work conducted thus far show that wood can be readily gasified in a steam environment into a hydrocarbon rich fuel gas that can be used as a replacement for petroleum based fuels or natural gas with minimal boiler retrofit. Further, this conversion can be achieved in a compact gasification reactor with heat supplied by a circulating entrained phase, thereby eliminating the need for an oxygen plant. Tars were found except at the lowest gasifier temperatures employed, and therefore heat recovery from the product gas should be much simpler than that from commercially available fixed bed gasification systems where product gas contains significant quantities of tar. The data generated were used in a preliminary conceptual design. Evaluation of this design shows that a medium Btu gas can be produced from wood at a cost competitive with natural gas or petroleum based fuels. DOE

N83-13602# Oklahoma Univ., Norman. School of Chemical Engineering and Materials Science.

DEVELOPMENT OF GEOTHERMAL BINARY-CYCLE WORKING-FLUID PROPERTIES: INFORMATION AND ANALYSIS OF CYCLES Final Report

K. E. STARLING, Z. I. MALIK, and C. T. CHU 30 Sep. 1981 7 p refs
(DE82-021542; DOE/ID-01719/5) Avail: NTIS HC A02/MF A01

Efforts were directed principally to the following tasks: (1) comparisons of mixture and pure fluid cascade cycles, (2) development of guidelines for working fluid selection for single boiler cycles, (3) continued evaluation of mixtures as working fluids, (4) working fluid thermophysical property correlation and

04 FUELS AND OTHER SOURCES OF ENERGY

presentation of properties information, (5) support to the INEL Conversion Technology Program. DOE

N83-13605# Great Plains Gasification Association, Detroit, Mich.

GREAT PLAINS GASIFICATION PROJECT Technical Progress Report, quarter ending 30 Jun. 1982

30 Jul. 1981 61 p

(Contract DE-FM02-82FE-55014)

(DE82-019500; DOE/FE-55014/T1) Avail: NTIS HC A04/MF A01

For the quarter ending June 30, 1982, engineering was on schedule for the Mine and slightly behind schedule for the Plant. There are no major engineering problems which would foreseeably impact the scheduled start up date for production. There were no major engineering changes for the quarter which would affect the technical baseline. Engineering for the next quarter will be directed to supporting the remaining portion of the summer construction schedule, completing the civil/structural design work, maintaining a high level of production for piping drawings and making significant progress in the electrical/instrument areas. DOE

N83-13629# Centro Informazioni Studi Esperienze, Milan (Italy). Documentation Service.

EXPERIMENTAL RESULTS OF A NONCONVENTIONAL ENERGY CONVERSION PILOT FACILITY-THERMOGRAVIMETRIC SYSTEM

S. AROSIO (Poltec. di Milan), M. BALESTRI (Ente Nazl. per l'Energia Elect., Pisa, Italy), F. BONFANTI, and G. SOTGIA (Poltec. di Milan) 1981 20 p refs Presented at 4th Intern. Conf. on Alternative Energy Sources, Miami, 14-16 Dec. 1981 (Contract ENEL-39/600)

(CISE-1754) Avail: NTIS HC A02/MF A01

The experimental analysis of a freon-water two-phase thermogravimetric pilot plant is presented. A comparison with mathematical models, developed for the determination of the geometric characteristics, component sizing, and off design performances of the thermogravimetric systems are also delineated. The pilot plant instrumentation and data acquisition system are described. A subroutine supplies the partial balance of the various plant components, the overall energy balance of the whole system and a preliminary analysis of the main characteristics of the two-phase flow. Curves showing the output power as a function of the actual design ratios of freon flow and hydraulic pressure drop are presented. The flow dynamic characteristics of the two-phase mixture are discussed. Author (ESA)

N83-13631# Massachusetts Inst. of Tech., Cambridge. Energy Lab

ESTIMATION OF RESOURCE AND RESERVES Final Report

M. A. ADELMAN, J. C. HOUGHTON, G. KAUFMAN, and M. ZIMMERMAN Mar. 1982 533 p refs Sponsored in part by Electric Power Research Inst.

(PB82-230954; MIT/EL-82-010) Avail: NTIS HC A23/MF A01 CSDL 10A

The economics of resource and reserve estimation are analyzed. The economic theory of natural resources and exhaustible resources are discussed. The measurement of already discovered deposits, undiscovered deposits, coal resource and reserve estimation, uranium, and a cumulative cost curve are also discussed. Author (GRA)

N83-13636# Bureau of Mines, Denver, Colo. Research Center. **EVALUATION OF A SHEATHED PERMISSIBLE EXPLOSIVE CHARGE FOR OPEN SHOOTING IN FLAMMABLE ATMOSPHERES: ADOBE CHARGE PROGRAM Technical Progress Report**

R. J. MAINIERO and J. E. HAY Apr. 1982 14 p

(PB82-220732; BM-TPR-118) Avail: NTIS HC A02/MF A01 CSDL 08I

A prototype nonincendive explosive rock-breaker charge that can be fired unconfined in underground bituminous coal mines without the danger of igniting a flammable atmosphere that might

be present is described. At present, unconfined shooting in underground coal mines is prohibited, but there are situations where the use of such shots would yield an overall improvement in safety. The charge consists of 1-1/2 lb of permissible water gel explosive in the form of a short cylinder 7 inches in diameter and 7/8 inches high, surrounded by a 1/2-inch-thick layer of damp salt, and encased in latex rubber reinforced with cheese cloth. The latex rubber housing provides a charge package that is strong enough to resist rough handling yet is pliable enough to conform to an irregular stone surface. A charge of this shape was found to be more effective at breaking rock than charges with lined or unlined cavities. GRA

N83-13650# Oak Ridge National Lab., Tenn. **ANALYSIS OF TREATED SLUDGES AND ASSOCIATED LEACHATES FROM COAL-CONVERSION FACILITIES**

M. P. MASKARINEC, D. K. BROWN, R. S. BRAZELL, and R. W. HARVEY 1981 21 p refs Presented at Natl. Am. Chem. Soc. Summer Meeting, N. Y., 23 Aug. 1981

(Contract W-7405-ENG-26)

(DE82-001488; CONF-810813-14) Avail: NTIS HC A02/MF A01

The classification of a solid waste as to degree of hazard involves the qualitative and quantitative analysis of potentially toxic materials in the waste and, subsequently, determination of the mobility of these materials in the environment. Analytical methods for organic compounds in coal conversion solid wastes are developed, as well as procedures for assessing the mobility of these compounds in the environment. Analytical methods for solid wastes and sludges are divided into two categories: (1) extraction of organics from the sample, and (2) determination of the individual components in the extraction is crucial to the reliability of the analytical data. Methods such as Soxhlet extraction (1), ultrasonic extraction (2) steam distillation (3), and three phase extraction systems were used for the analysis of target compounds in solid wastes. DOE

N83-13673# Acurex Corp., Morrisville, N.C.

PILOT-SCALE ASSESSEMENT OF CONVENTIONAL PARTICULATE CONTROL TECHNOLOGY FOR PRESSURIZED FLUIDIZED-BED COMBUSTION EMISSIONS Final Report, Mar. 1979 - Jun. 1980

W. O. LIPSCOMB, III, S. R. MALANNI, C. L. STANLEY, and S. P. SCHLIESSER Apr. 1982 132 p refs

(Contract EPA-68-02-2646)

(PB82-230921; EPA-600/7-82-028) Avail: NTIS HC A07/MF A01 CSDL 13B

Results of an evaluation of electrostatic precipitator (ESP) and fabric filter particulate control technology for the EPA/Exxon pressurized fluidized bed combustion (PFBC) Miniplant in Linden, NJ are given. EPA's mobile ESP and fabric filter pilot facilities were slip streamed downstream of the Miniplant's tertiary cyclone to simulate the flue gas stream exiting a PFBC combined cycle gas turbine. Results presented include control device operating characteristics and performance based on mass and fractional collection efficiencies. Author (GRA)

N83-13694# North Dakota Geological Survey, Grand Forks. **COMPUTER MANAGEMENT OF GEOLOGIC AND PETROLEUM DATA AT THE NORTH DAKOTA GEOLOGICAL SURVEY**

K. L. HARRIS, L. M. WINCZEWSKI, and H. R. UMPHREY 1982 37 p refs

(DE82-904385; NP-2905271; REPT-74) Avail: NTIS HC A03/MF A01

A map-oriented data management system, GEOSTOR, is described. General and specific design criteria are discussed in addition to the data elements, coordinate systems, and data entry and retrieval. DOE

04 FUELS AND OTHER SOURCES OF ENERGY

N83-13695# Research Inst of National Defence, Stockholm (Sweden).

SEISMOLOGY, 1981, NUCLEAR TEST BAN VERIFICATION. EARTHQUAKE AND EARTH RESOURCE INVESTIGATION Progress Report, 1981

Jul 1982 91 p refs

(FOA-C-20460-T1) Avail. NTIS HC A05/MF A01

Seismological projects, including nuclear explosion monitoring, the development of international data centers, seismic risk estimation for nuclear power plants, oil exploration using seismic methods, and crystalline rock investigation using seismic cross hole measurements are reported on. In 1981, France conducted 11 nuclear tests, Britain 1, the US 16, and the USSR 21. The explosions were within the 150 kton limit. Author (ESA)

N83-13975# Commissariat a l'Energie Atomique, Paris (France). **NUCLEAR FUEL CYCLE AND WASTE MANAGEMENT IN FRANCE**

Y SOUSSELIER May 1981 9 p Presented at the Intern. Conf. on Computing in Civil Eng., New York, 11-15 May 1981

(DE81-700732, CEA-CONF-5721; CONF-810517-2) Avail: NTIS (US Sales Only) HC A02/MF A01; DOE Depository Libraries

After a short description of the nuclear fuel cycle mining, milling, enrichment and reprocessing, radioactive waste management in France is exposed. The different types of radioactive wastes are examined. Storage, solidification and safe disposal of these wastes are described. DOE

N83-14165# Naval Research Lab., Washington, D. C. **PYROLYSIS OF ORGANIC COMPOUNDS CONTAINING LONG UNBRANCHED ALKYL GROUPS Final Report**

G. W. MUSHRUSH and R. N. HAZLETT 21 Sep. 1982 30 p refs

(Contract WR0240201)

(AD-A119749; NRL-8630) Avail: NTIS HC A03/MF A01 CSCL 07D

The presence of n-alkanes in jet fuel in the right distillation range can be explained if large n-alkanes are present in the crude-oil source. Quantities of large n-alkanes present in crudes made from shale are insufficient, however, to explain the amounts found (up to 37%) in the jet fuel made from these crudes. Although possible precursors to small straight chain molecules are branch alicyclic compounds or substituted cyclic compounds, this report shows that attack in the side chain of model aromatic compounds typically found in shale crudes affords a path to significant yields of n-alkanes. Primary attack at the alpha and gamma positions is favored for substituted benzenes and pyridines. The major initial product distribution can be explained on the basis of Fabuss-Smith-Satterfield theory Author (GRA)

N83-14178# Centec Consultants, Inc., Reston, Va. Office of Industrial Programs.

PROGRAM GUIDE TO USED OIL RECYCLING

Jan. 1982 40 p refs Supersedes DOE/CS-0015

(Contract DE-AC01-80CS-40402)

(DOE/CS-40402/1; DOE/CS-0015) Avail. NTIS HC A03/MF A01

Information necessary to organize a used oil recycling program, establish collection points, and enlist the cooperation of concerned individuals and civic minded groups is presented. Emphasis is placed on salvaging a valuable energy resource and reducing environmental pollution caused by indiscriminate dumping and uncontrolled burning. J.M.S

N83-14189# Southwest Research Inst., San Antonio, Tex. Army Fuels and Lubricants Research Lab.

INSTALLATION OF A DIESEL ENGINE COMBUSTION/IGNITION EVALUATION FACILITY Interim Report, Oct. 1980 - Sep. 1981

D. M. YOST, T. W. RYAN, III, and E. C. OWENS Dec. 1981 72 p refs

(Contract DAAK70-80-C-0001; DAAK70-82-C-0001; DA PROJ. 1L7-62733-AH-20)

(AD-A119610; AFLRL-152; SWRI-6800-123) Avail: NTIS HC A04/MF A01 CSCL 21G

A facility for examining shale fuel property-related combustion/ignition effects on diesel engine performance has been installed at the U.S. Army Fuels and Lubricants Research Laboratory (AFLRL). The facility consists of a single-cylinder conversion of a three-cylinder, two-stroke cycle engine, an engine instrumentation package for determining combustion efficiencies, and a dedicated system for rapid data acquisition. The computer system and software has been developed with the flexibility to expand into other areas of fuels and combustion research. The facility will be an effective tool in the continuing development of Army mobility fuels. Author (GRA)

N83-14192# Wisconsin Univ., Madison. Dept. of Mechanical Engineering

DIESEL COMBUSTION ANALYSIS USING RAPID SAMPLING TECHNIQUES Final Report, Jul. 1978 - Jul. 1982

G. L. BORMAN, P. S. MYERS, and C. A. UYEHARA Aug. 1982 13 p refs

(Contract DAAG29-80-C-0129; DAAG29-78-G-0146)

(AD-A119658, ARO-14251.3-EG; ARO-15788.3-EG) Avail. NTIS HC A02/MF A01 CSCL 21G

The purpose of the research was to obtain a better understanding of the fundamental processes which take place in a diesel cylinder during combustion. A single cylinder, open chamber engine with a special head designed to allow in-cylinder sampling was used for the research. Using a conventional injector, two kinds of sampling projects were carried out; timed sampling of small local samples using a probe and total cylinder sampling, achieved by suddenly expanding and transferring 80% of the cylinder content to a quench chamber. A third study used an electronic fuel injection system to study the effects of injection parameters on performance, heat release, ignition delay and exhaust emissions. GRA

N83-14197# Los Alamos Scientific Lab., N. Mex.

LASER-ISOTOPE-SEPARATION TECHNOLOGY

R. J. JENSEN and L. S. BLAIR 1981 8 p Presented at the Ind. US/Japan Conf. on Laser Mater. Process, Anaheim, Calif., 16-17 Nov. 1981

(Contract W-7405-ENG-36)

(DE81-030114; LA-UR-81-2423-REV; CONF-811116-1-REV)

Avail: NTIS HC A02/MF A01

The Molecular Laser Isotope Separation (MLIS) process is discussed as an operative example of the use of lasers for material processing. The MLIS process, which uses infrared and ultraviolet lasers to process uranium hexafluoride (UF₆) resulting in enriched uranium fuel to be used in electrical-power-producing nuclear reactor, is reviewed. The economics of the MLIS enrichment process is compared with conventional enrichment technique, and the projected availability of MLIS enrichment capability is related to estimated demands for U.S. enrichment service. The lasers required in the Los Alamos MLIS program are discussed in detail, and their performance and operational characteristics are summarized. Finally, the timely development of low-cost, highly efficient ultraviolet and infrared lasers is shown to be the critical element controlling the ultimate deployment of MLIS uranium enrichment. DOE

04 FUELS AND OTHER SOURCES OF ENERGY

N83-14198# Stanford Univ., Calif. High Temperature Gasdynamics Lab
PULVERIZED COAL COMBUSTION Semiannual Report, 1 Apr. - 30 Sep. 1981
 M. JOST, I. LESLIE, and C. H. KRUGER Oct. 1981 30 p refs (Contract DE-AC22-80PC-30177)
 (DE82-002969; DOE/PC-30177-2; HTGL-127/48) Avail: NTIS HC A03/MF A01

A flow tube reactor for the study of the reactivity of pulverized coal under controlled conditions has been developed at Stanford University. The reactor system incorporates optical diagnostics as well as probe sampling techniques to measure the reactivity of coals with differing physical and chemical properties. The aim of the research is to provide fundamental data that can be used in the design and development of coal combustion systems. Several major improvements have recently been made on the flow tube reactor. These changes result in more flexibility in controlling the fluid mechanics, more extensive data gathering capabilities for the diagnostics, and higher data rates. Both diffusional and kinetically controlled reactivity limits have been found in our Montana Rosebud coal experiments. Surface reactivity was not always found to increase with gas temperature DOE

N83-14202# Brookhaven National Lab., Upton, N. Y.
DESIGN AND PREPARATION OF NEW, HIGHLY ACTIVE FISCHER-TROPSCH CATALYSTS
 R. SAPIENZA, W. SLEGEIR, and T. OHARE 1981 24 p refs Presented at 91st Natl Meeting of the AM. Inst. of Chem. Engr., Detroit, Mich., 16 Aug. 1981
 (Contract DE-AC02-76CH-00016)
 (DE82-003670; BNL-30289; CONF-810814-10) Avail: NTIS HC A02/MF A01

The application of the fundamental principles of the oxide mechanism of Fischer-Tropsch synthesis which emphasizes the relation between metal-oxygen bond strengths and catalyst activity, has resulted in a new series of highly active Fischer-Tropsch catalysts. These systems may point the way to future syngas catalyst development. The unique structural features of these catalysts have demonstrated the importance of surface structure and its relationship to catalyst composition and activity. DOE

N83-14205# Battelle Columbus Labs, Ohio.
CAO INTERACTIONS IN THE STAGED COMBUSTION OF COAL Quarterly Technical Progress Report, 1 Jul. - 30 Sep. 1981
 A. LEVY and E. L. MERRYMAN 1981 31 p refs (Contract DE-AC22-80PC-30301)
 (DE82-003273; DOE/PC/30301/4; QTPR-4) Avail: NTIS HC A03/MF A01

The reaction of sulfur-bearing compounds with CaO to form CaS, a kinetic and chemical parameters governing CaS and CaSO₄ formation in staged combustion were investigated. The reaction of pyrite with CaO in the absence of oxygen produced CaS in increasing amounts as the temperature was raised to at least 1100 C, reaching a maximum 50 percent conversion at 1100 C after several second reaction time. The rate of CaS formation decreased significantly with time at this temperature. An unidentified compound also formed at the higher temperatures and longer reaction times which appeared to contain significant amounts of calcium and iron. At short reaction times, much of the sulfur appeared to be tied up as pyrrhotites and unreacted FeS₂ with some CaS and possibly CaSO₄ present. The reaction of H₂S and COS with CaO is rather slow in the absence of oxygen. The formation of CaS from combustion of pulverized coal in a methane flame was investigated. DOE

N83-14206# Oak Ridge National Lab., Tenn.
CHEMICALS ENHANCED OIL RECOVERY Semiannual Report, 1 Apr. - 30 Sep. 1980
 A. L. COMPERE, J. M. CRENSHAW, S. V. GREENE, W. L. GRIFFITH, J. S. JOHNSON, JR., R. M. JONES, L. J. MAGID, R. TRIOLO, and C. G. WESTMORELAND Nov. 1981 41 p refs (Contract W-7405-ENG-26)
 (DE82-003475; DOE-BETC-OR-18) Avail: NTIS HC A03/MF A01

Progress reports are presented for the following research areas: phase behavior in multicomponent systems containing tall oil ethoxylates; anionic tall oil derivatives (materials and methods, phase studies, interfacial tensions); sacrificial agents; economic considerations in materials selection; and materials and methods. A survey on the availability of materials, which could be used for micellar flooding revealed that some of the alternative chemicals could substantially decrease micellar flooding chemical costs. Production of C₃ and C₄ alcohols and vegetable and tall oil fatty acids appear at a high enough level so that their use to produce one million bbl of incremental oil per day would consume a substantial but not prohibitive fraction. DOE

N83-14207# Air Products and Chemicals, Inc., Allentown, Pa.
CATALYST AND REACTOR DEVELOPMENT FOR A LIQUID-PHASE FISCHER-TROPSCH PROCESS Quarterly Technical Progress Report, 1 Jul. - 30 Sep. 1981
 P. N. DYER, R. PIERANTOZZI, B. W. BRIAN, and J. V. BAUER Oct. 1981 38 p refs (Contract DE-AC22-80PC-30021)
 (DE82-003369; DOE/PC-30021/T7) Avail: NTIS HC A03/MF A01

Progress in investigations carried out in Task 2, slurry catalyst development, and in Task 3, slurry reactor design studies is reported. In Task 2, the 300 mL and 1000 mL slurry reactors ordered were constructed and instrumented. Mass transfer tests in the No. 1 300 mL slurry reactor were incorporated into the baseline catalyst test, because of the low activity that was found in two tests of a ruthenium methanation catalyst in the slurry phase. Two modified conventional catalysts were prepared and five gas phase screening tests were carried out, giving additional information on the conditions required to produce an enhanced C₁₀(+) fraction. Eight supported cluster catalysts were synthesized, and eleven were screened in the gas phase. In Task 3, measurements of gas holdup and solids dispersion were completed for the silica/isoparaffin system. Preliminary correlations were derived for gas holdup as a function of gas velocity and slurry density; a near zero-order dependence upon slurry velocity was observed. The column solids profile was constant for the conditions studied. Bubble diameters were measured photographically in the two-phase system. DOE

N83-14208# Bituminous Coal Research, Inc., Monroeville, Pa.
PETROGRAPHIC EVALUATION OF PYRITE IN THE PRODUCTS FROM TWO-STAGE COAL-PYRITE FLOTATION Final Report, 1 Apr. 1980 - Nov. 1981
 R. S. TOMICH and R. S. MOSES Nov. 1981 46 p refs (Contract DE-AC22-80PC-30134)
 (DE82-003593; DOE/PC-30134-1) Avail: NTIS HC A03/MF A01

The extent of pyritic sulfur reduction by the two-stage coal-pyrite flotation process can be predicted from the results of petrographic analyses conducted on the raw coal feed sample. Correlation studies show that the specific coal and pyrite characteristics that have a major influence on reduction of pyritic sulfur are: (1) coal rank; (2) the degree of pyrite liberation; (3) amount of pyrite available (pyritic sulfur, percent of total sulfur); and (4) pyrite-size distribution (especially the percentage of pyrite particles less than 32-micron size). The results of chemical analysis may be used to monitor a coal's response to the two-stage coal-pyrite flotation process; however, petrographic analysis is essential to precisely define the coal and pyrite characteristics that influence this response. DOE

04 FUELS AND OTHER SOURCES OF ENERGY

N83-14291# Federal Aviation Administration, Washington, D.C.
THE IMPACT OF PETROLEUM, SYNTHETIC AND CRYOGENIC FUELS ON CIVIL AVIATION Final Report

C. L. BLAKE Jun. 1982 210 p
(FAA-EM-82-29) Avail: NTIS HC A10/MF A01

Various concerns with regard to aviation fuels are discussed, including price, the effects of supply and demand, the various sources and forms of supply, alternatives, and conservation measures which reduce demand. The likelihood, the nature, and the effects of disruption in foreign crude oil deliveries to the United States are discussed. R.J.F.

N83-14293*# Chem Systems, Inc., New York.
TECHNICAL AND ECONOMIC ASSESSMENT OF PROCESSES FOR THE PRODUCTION OF BUTANOL AND ACETONE Final Report

Sep 1982 77 p refs Prepared for JPL
(Contract NAS7-100; JPL-956277)
(NASA-CR-169623; NAS 1.26:169623) Avail: NTIS HC A05/MF A01 CSDL 21D

This report represents a preliminary technical and economic evaluation of a process which produces mixed solvents (butanol/acetone/ethanol) via fermentation of sugars derived from renewable biomass resources. The objective is to assess the technology of producing butanol/acetone from biomass, and select a viable process capable of serving as a base case model for technical and economic analysis. It is anticipated that the base case process developed herein can then be used as the basis for subsequent studies concerning biomass conversion processes capable of producing a wide range of chemicals. The general criteria utilized in determining the design basis for the process are profit potential and non-renewable energy displacement potential. The feedstock chosen, aspen wood, was selected from a number of potential renewable biomass resources as the most readily available in the United States and for its relatively large potential for producing reducing sugars. Author

N83-14294# Naval Research Lab., Washington, D. C.
THE EFFECT OF ADDITIVES ON THE AEROSOLIZATION OF JP-5 JET FUEL Final Report

R. C. LITTLE, R. PRATT, and J. B. ROMANS 25 Aug 1982 33 p refs
(AD-A119324; NRL-MR-4694) Avail: NTIS HC A03/MF A01 CSDL 21D

The May spinning top aerosol generator was used to generate aerosols from neat Navy jet fuel and selected dispersions of three types of polymer additives in the jet fuel. The additives selected were Oppanol B-200, a Vistanex Series, and a proprietary antimisting additive designated as FM-9. The mass median diameter (MMD) of the droplets produced was studied as a function of additive concentration and spinning top velocity for each additive. In the case of each additive the MMD significantly increased with concentration at constant RPS. The effect of the Oppanol B-200 was comparable to that of FM-9 with respect to its influence on the MMD. GRA

N83-14299# Carnegie-Mellon Univ., Pittsburgh, Pa. Center for Energy and Environmental Studies
PROGRAM OF BASIC RESEARCH ON THE UTILIZATION OF COAL-WATER MIXTURE FUELS Quarterly Report, period ending 30 Sep. 1981

E. Z. CASASSA, J. PADMANBAN, G. D. PARFITT, S. A. RAO, E. S. RUBIN, H. T. SOMMER, and E. W. TOOR 1981 18 p refs
(Contract DE-FG22-81PC-40285)
(DE82-002232; DOE/PC-40285/T1) Avail: NTIS HC A02/MF A01

Two areas of special importance to the successful use of coal-water slurries are discussed: mixture stability and atomization. Activities in the study of mixture stability are reviewed. The atomization of coal-water slurries is discussed. DOE

N83-14300# United Technologies Research Center, East Hartford, Conn

REACTION-INDUCED TEMPERATURE DEVIATIONS DURING COAL DEVOLATILIZATION IN A HEATED GRID

J. D. FREIHAUT, M. F. ZABIELSKI, and D. J. SEERY 1981 10 p refs

(Contract DE-AC21-81MC-16221)
(DE82-003864; DOE/MC-16221/T5) Avail: NTIS HC A02/MF A01

The effects of sample characteristics on local heating of the grid were examined to assess the influence of devolatilization on programmed heating rates. The devolatilization process on the time temperature history of the local screen in immediate contact with the sample was determined. With respect to the coal particles, the direct implication is that the temperature path is the resultant of several components: the resistive heating of the grid, the physical properties of the samples, the devolatilization properties of the sample. Once the range of devolatilization temperatures of a particular coal is achieved, the primary devolatilization process appears to dominate the temperature-time trajectory. In addition, the data appears to indicate that the heat requirement varies with the rank characteristics of the coal. The tar release is closely coupled in time to the devolatilization-induced temperature deviations during primary devolatilization and the onset of the tar release significantly precedes the slower light hydrocarbon gas evolution. GRA

N83-14301# Pennsylvania State Univ., University Park. Dept. of Mineral Engineering.

EXPANSION OF COAL-PREPARATION-PLANT SIMULATOR Progress Report, 1 Jul. - 30 Sep. 1981

P. T. LUCKIE and L. G. AUSTIN 1 Oct. 1981 19 p refs
(Contract DE-AC22-80PC-30144)
(DE82-001576; DOE/PC-30144/T5) Avail: NTIS HC A02/MF A01

Progress in the development and testing of modules for a centrifuge and a vacuum filter is reported. These modules have the following special characteristics: comminution and size degradation calculations for the centrifuge; loss of fines to the filtrate and concentrate liquors and subsequent change in particle size distributions, calculation of equilibrium moisture content for the finished cake; and estimation of the final moisture content based on the equilibrium moisture content and the time the coal particles are exposed to the desaturating forces. The modules were incorporated into the main simulation program and tested using three typical feeds for coal preparation plants. Results were good with the exception of the calculation of the equilibrium moisture content. The final summary reports were expanded to include overall flow rates of clean coal, middling and refuse leaving the plant, overall yield data; and overall economic (cost) data. The economic calculations require a knowledge of the hourly tonnage of raw coal entering the plant, the number of hours of operation per week, and an overall annualized cost. DOE

N83-14306# Naval Postgraduate School, Monterey, Calif.
THE USE OF BUOYANCY TO LIFT HEAVY OBJECTS FROM THE SEA M.S. Thesis - MIT

R. P. FISKE Jun. 1981 138 p refs
(AD-A119320) Avail: NTIS HC A07/MF A01 CSDL 13J

To recover oil from economically marginal offshore fields the re-use of production platforms has been considered. Re-use involves severing the jacket from the seabed, rotating the jacket to the horizontal and lifting it through the air/sea interface in a configuration suitable for towing. Five systems are considered for use in the recovery process. Two systems currently used for installation are found suitable for modification to recover jackets. They are the pontoon barge system and the self-floating tower. Major problems to be overcome in modifying for retraction are mating of the pontoon barge with the tower, developing a pile system which can be refurbished, and ensuring transverse stability on retraction through the air/sea interface. GRA

04 FUELS AND OTHER SOURCES OF ENERGY

N83-14454# Los Alamos Scientific Lab., N. Mex.
NUMERICAL SIMULATION OF FLUID FLOW IN POROUS/FRACTURED MEDIA
 B. J. TRAVIS and T. L. COOK 1981 8 p refs Presented at the 5th Uranium Seminar, Albuquerque, N. Mex., 20-23 Sep. 1981 (Contract W-7405-ENG-36)
 (DE82-002631; LA-UR-81-3256; CONF-810949-2) Avail: NTIS HC A02/MF A01

Theoretical models of fluid flow in porous/fractured media can help in the design of in situ fossil energy and mineral extraction technologies. Because of the complexity of these processes, numerical solutions are usually required. Sample calculations illustrate the capabilities of present day computer models. DOE

N83-14495# National Center for Resource Recovery, Washington, D. C.
INVESTIGATION OF ENGINEERING AND DESIGN CONSIDERATIONS IN SELECTING CONVEYORS FOR DENSIFIED REFUSE-DERIVED FUEL (DRDF) AND DRDF: COAL MIXTURES Final Report, Jun. 1980 - Sep. 1981
 Z. KAHN, M. L. RENARD, and J. CAMPBELL Tyndall AFB, Fla AFESC Aug. 1981 129 p refs
 (Contract MIPR-N-80-33; EPA-R-806709; AF PROJ. 2054) (AD-A119065; AFESC/ESL-TR-81-58) Avail: NTIS HC A07/MF A01 CSCL 13C

An engineering evaluation and experimental program involving several types of conveyors applied to blends of densified refuse-derived fuel (dRDF) and blends of dRDF and coal, was conducted by the National Center for Resource Recovery. The final project report discusses the properties of waste affecting convey ability and presents experimentally determined values or observed characteristics. A procedure was selected for the assessment, selection, and operation of belt conveyors based on spillage rate. Corroborating experimental results from a recirculating test rig operated with samples of dRDF and a blend of dRDF and coal over a range of belt configurations, velocities and flow rates were also presented. Experiments conducted on a vibrating pan conveyor over a range of frequencies and stroke length, and on a small apron conveyor, were described and the test results analyzed. Author (GRA)

N83-14607*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
LONGWALL SHEARER TRACKING SYSTEM Patent Application
 P. D. POULSEN (Adjunct Systems, Inc.), R. J. STEIN, and R. E. PEASE, inventors (to NASA) 15 Nov. 1982 20 p
 (Contract NAS8-34185) (NASA-CASE-MFS-25717-1; US-PATENT-APPL-SN-441897) Avail: NTIS HC A02/MF A01 CSCL 08I

A tracking system for measuring and recording the movements of a longwall shearer vehicle includes an optical tracking assembly carried at one end of a desired vehicle path and a retroreflector assembly carried by the vehicle. Continuous horizontal and vertical light beams are alternately transmitted by means of a rotating Dove prism to the reflector assembly. A vertically reciprocating reflector interrupts the continuous light beams and converts these to discrete horizontal and vertical light beam images transmitted at spaced intervals along the path. A second rotating Dove prism rotates the vertical images to convert them to a second series of horizontal images while the first mentioned horizontal images are left unrotated and horizontal. NASA

N83-14628# Electromagnetic Systems Labs., Inc., Sunnyvale, Calif. Imagery Data Systems.
REMOTE SENSING APPLICATIONS TO THE DEVELOPMENT OF AN INTEGRATED DATA BASE FOR OIL AND GAS EXPLORATION
 R. J. HALL /in ESA Satellite Remote Sensing for Developing Countries p 171-174 Jun. 1982 refs
 Avail: NTIS HC A11/MF A01

Techniques employed in oil and gas exploration and the utility of satellite data to the exploration process are discussed. The

application of satellite information to geologic analysis, planimetric mapping and other data collection efforts associated with the search for oil and gas are considered. Geographic information and image processing features that were utilized in three projects are outlined and the potential of data sources such as LANDSAT-D is assessed. Experience shows that satellite imagery is of greatest benefit when it is integrated into a comprehensive data base with conventional data. Author (ESA)

N83-14658# California Univ., Riverside. Inst. of Geophysics and Planetary Physics.
AN INTEGRATED MODEL FOR THE NATURAL FLOW REGIME IN THE CERRO PRIETO HYDROTHERMAL SYSTEM, B.C., MEXICO, BASED UPON PETROLOGICAL AND ISOTOPE GEOCHEMICAL CRITERIA
 W. A. ELDERS, A. E. WILLIAMS, and J. R. HOAGLAND 1981 7 p refs Presented at the 3rd Symp. on the Cerro Prieto Geothermal Field in Baja California, Mexico, San Francisco, Mar. 1981 (Contract DE-AT03-80SF-11458)
 (DE82-001980; CONF-810399-3) Avail: NTIS HC A02/MF A01

Studies of cuttings and core at Cerro Prieto have now been extended to more than 50 boreholes. The aims of this petrological and isotopic work are to determine the shape of the reservoir, its physical properties, and its temperature distribution and flow regime before the steam field was produced. A map showing the first occurrence of hydrothermal epidote shows a dome shaped top to the steam producing zone. The hottest of the mapped mineral zones - the biotite vermiculite zone - shows a dome displaced to the northeast relative to the epidote zone. Patterns of mineral zones observed in wells are consistent with patterns of oxygen isotopic ratios in calcite and quartz. Using both criteria all of the boreholes so far studied were classified as belonging to one of four different regimes. DOE

N83-14661# California Univ., Riverside. Inst. of Geophysics and Planetary Physics.
USE OF WIRELINE LOGS AT CERRO PRIETO IN IDENTIFICATION OF THE DISTRIBUTION OF HYDROTHERMALLY ALTERED ZONES AND DIKE LOCATIONS AND THEIR CORRELATION WITH RESERVOIR TEMPERATURES
 D. T. SEAMOUNT, JR. and W. A. ELDERS 1981 6 p refs Presented at the 3rd Symp. on the Cerro Prieto Geothermal Field in Baja California, Mexico, San Francisco, Mar. 1981 (Contract DE-AT03-80SF-11458)
 (DE82-001981; CONF-810399-5) Avail: NTIS HC A02/MF A01

Downhole electrical and gamma-gamma density logs from nine wells were studied and the wireline log parameters with petrologic, temperature, and petrophysical data were correlated. Wells M-43, T-366, and M-107 are discussed as typical cases. Log data for shales show good correlation with four zones of hydrothermal alteration previously recognized on the basis of characteristic mineral assemblages and temperatures. GRA

N83-14750# Los Alamos Scientific Lab., N. Mex.
POWER FROM THE HOT-DRY-ROCK GEOTHERMAL RESOURCE
 N. M. BECKER, R. A. PETTITT, and R. H. HENDRON 1981 30 p refs Presented at ASME/IEEE Joint Power Generation Conf., St. Louis, 4 Oct. 1981 (Contract W-7405-ENG-36)
 (DE82-000759; LA-UR-81-2842; CONF-811008-3) Avail: NTIS HC A03/MF A01

The history of the development of the first hot dry rock (HDR) reservoir is presented. Particulars on the surface piping and data collection system are described. It is found that the geothermal reservoir growth is due in large part to pressurization and thermophysical effects. The impedance to flow along the fractures within the reservoir decreases as thermal contraction and pressurization of the reservoir continue to open natural joints. Minimal environmental effects were noted as a result of closed system circulation; and the chemical quality of the geothermal

04 FUELS AND OTHER SOURCES OF ENERGY

fluid is good, in contrast to the corrosive geothermal fluids in many hydrothermal systems. It is found that an HDR system is operational, and is used to answer questions raised by the theoretical research. The types and options of power generation available are addressed. A binary fluid cycle that can use nonaqueous working fluids is an alternative to single or multiple flash systems. These nonaqueous fluids may fall within a large range of hydrocarbon, fluorocarbon, and organic fluids. The R-114 was tested in binary cycle at Fenton Hill and was chosen largely for its heat transfer characteristics and previous industrial experience GRA

N83-14752# California Univ., Berkeley. Lawrence Berkeley Lab. Energy and Environment Div.

CATALYTIC LIQUEFACTION OF BIOMASS

H. DAVIS, C. FIGUEROA, C. KARATAS, D. KLODEN, L. SCHALEGER, and N. YAGHOUBZADEH Oct. 1981 29 p refs Presented at the 13th Biomass Thermochem. Conversion Contractors Meeting, Washington, D C, 27-29 Oct. 1981 (Contract W-7405-ENG-48) (DE82-003329; LBL-13449; CONF-8110115-1) Avail: NTIS HC A03/MF A01

The bench scale continuous liquefaction unit (CLU) in operation as a back mixed reactor. It is used to explore a factorial experiment in temperature, time, slurry pH, gas to slurry feed ratio and other variables. It is available for a wide range of biomass or even fossil feedstocks. New methods of characterizing oil and water soluble products were developed and applied to CLU products. Conditions under which formate ion, probable intermediate in both water gas shift reaction and reduction of biomass oxygen by CO, is formed in large quantities are found. Raw wood chips undergo solvolysis, total dissolution, when mixed with wood liquefaction oil and heated under certain conditions. This phenomenon must occur to some degree in the initial stages of the PERC process. It is suggested that solvolysis is a possible way to get the benefits of oil recycle. Without the uneconomically high recycle ratios of the PERC process. GRA

N83-14775# Pennsylvania State Univ., University Park Dept. of Chemistry.

DEVELOPMENT OF INSTRUMENTAL METHODS OF ANALYSIS OF SULFUR COMPOUNDS IN COAL PROCESS STREAMS Final Technical Report, 30 Sept. 1977 - 29 Sep. 1981

J. JORDAN 1981 12 p refs (Contract DE-AC22-77ET-10482) (DE82-003253; DOE/ET-10482/T4) Avail: NTIS HC A02/MF A01

The general objective was resource development in the analytical chemistry of sulfur compounds for the evolving new coal technologies. Based on fundamental considerations, judiciously selected methods of instrumental analysis were developed for determining sulfur compounds in coal conversion process streams. Significant sulfur moieties were identified with the aid of thermodynamic criteria, taking into account the blocking of some equilibria by sluggish kinetics. Two discrete types of procedures were developed for selected moieties, viz., (1) enthalpimetric methods, which rely on measurements of heats of reaction in adiabatic cells; (2) voltammetric methods, using glassy carbon indicator electrodes. Stability domains of thirty-six (36) inorganic sulfur compounds were mapped as functions of redox potential and pH. Based on this information, the occurrence probability of specified sulfur contaminants in coal conversion streams was assessed. DOE

N83-14795# Global Geochemistry Corp., Canoga Park, Calif. **GEOCHEMICAL STUDIES OF CORES FROM THE SAN JUAN BASIN RESEARCH SITE, GRANTS URANIUM REGION, NEW MEXICO Final Report**

R. HADDAD, I. KAPLAN, D. CARLISLE, K. DELANCEY (California Univ., Irvine), and V. P. GUINN (California Univ., Irvine) Sep. 1981 255 p refs (Contract DE-AC13-76GJ-01664) (DE82-004153; GJBX-312-81) Avail: NTIS HC A12/MF A01

A geochemical study performed in the southern part of the Grants Uranium Region is described. Five hundred samples were analyzed for a suite of 23 trace and minor elements. One hundred samples were analyzed for (13)C/(12)C and (18)O/(16)O on carbonates, (13)C/(12)C on organic matter, (34)S/(32)S on sulfur, total sulfur and total organic and inorganic carbon. A detailed study was performed on carbonaceous material by separating the kerogen and extracting the bituminous material. From the study, it was inferred that the deposit is a modified primary or trend deposit altered by solutions. The evidence is based upon the following parameters: (1) there is no correlation between the carbon and uranium contents and the content of carbonaceous material is generally uniform between 0.05 to 0.10%; (2) sulfur isotope ratios of pyrite associated with uranium mineralization from a bimodal distribution. DOE

N83-14816 Virginia Univ., Charlottesville.

WIND POWER ASSESSMENT ALONG THE ATLANTIC AND GULF COASTS OF THE UNITED STATES Ph.D. Thesis

J. W. SNOW 1981 260 p Avail: Univ. Microfilms Order No. DA8219076

A methodology is developed for producing detailed wind power surveys. It is applied in areas of the U.S. Atlantic and Gulf coastal zones. The initial steps in estimating the amount and areal distribution of wind power are climatological. A numerical model of the atmosphere which treats explicitly the physical processes occurring with the boundary layer is conditioned to represent the geophysical aspects of the designated area. Five wind regimes are identified, using essentially the classical mid-latitude cyclone concept, and, by region, the length of each wind season is determined along with the composition of each season in terms of the frequency of occurrence of each regime. The three season-regime situations occurring most frequently are identified and typical cases of each are selected from meteorological records. Dissert. Abstr.

N83-14877# National Academy of Sciences - National Research Council, Washington, D. C. Committee on Arctic Seafloor Engineering.

UNDERSTANDING THE ARCTIC SEA FLOOR FOR ENGINEERING PURPOSES

1982 141 p refs (Contract N00014-80-G-0034) (AD-A119773) Avail: NTIS HC A07/MF A01 CSCL 08J

This report identifies and assesses those arctic seafloor phenomena that influence the design and operation of facilities and platforms for exploring and producing oil, gas, and hard minerals both on and under the sea floor. It also identifies knowledge that is needed of seafloor phenomena and conditions, and, for several areas of major concern, recommends specific research. These recommendations are intended to enhance the ability of the engineer and operator to anticipate and avoid problems that may be posed by seafloor and coastal phenomena, and guard against the effects of such events as thaw subsidence and erosion. Permafrost, often thought to be found only on land, is found extensively beneath the sea floor of the Beaufort Sea, and, to an extent not well known, under the Chukchi and Bering seas. A relict of the geological past, it was covered by rising arctic oceans. Permafrost can deteriorate because of natural or man-induced effects and can reform again. GRA

04 FUELS AND OTHER SOURCES OF ENERGY

N83-15322# Atomic Energy Research Establishment, Harwell (England). Computer Science and Systems Div.

AN EFFICIENT FULLY IMPLICIT SIMULATOR

B. A. FOSTER, P. F. NACCACHE, M. O. NICHOLAS, R. K. POLLARD, D. K. PONTING, J. RAE, D. BANKS (British National Oil Corp., Glasgow), and S. K. WALSH (AEE Winfrith) May 1982 39 p refs

(CSS-126) Avail: NTIS HC A03/MF A01

An efficient general purpose black oil simulator, PORES, now in production use for modelling North Sea fields is described. The fully implicit finite difference equations are solved for each time step using a Newton-Raphson procedure. The resulting large sets of linear equations are usually solved simultaneously by a powerful iterative method which uses a preconditioned conjugate gradient algorithm with an enforced column sum condition to accelerate convergence. A sequential solution option is available and direct matrix inversion methods are also provided. Gas condensate problems are handled by a variable switching technique. Four examples are presented to illustrate the power and efficiency of the program. S.L.

N83-15395# Sandia Labs., Albuquerque, N Mex EFFECTS OF SOLVENT COMPOSITION AND CONCENTRATION ON EARLY LIQUEFACTION REACTIONS

M G. THOMAS 1981 16 p Presented at the H-Coal Tech. Advisory Comm. Meeting, Catlettsburg, Ky., 15 Sep. 1981

(Contract DE-AC04-76DP-00789)

(DE82-004136; SAND-81-2000C; CONF-810999-1) Avail: NTIS HC A02/MF A01

The early reaction chemistry of coal liquefaction includes the dissolution of coal by reaction with solvent to produce preasphaltenes. The subsequent decomposition to asphaltenes and finally to oils can be described with a classic series reaction mechanism. Neither dissolution nor upgrading rates are independent of solvent. In terms of solvent, dissolution appears to be stoichiometric with preasphaltene formation, and secondary reaction rates are dependent upon hydrogen availability. Some of the ramifications of these early reactions are: multistage processing; effective utilization of catalysts; tailored product slate; and hydrogen utilization. DOE

N83-15402# Avco-Everett Research Lab., Mass. VOLATILE PRODUCTION DURING PREIGNITION HEATING Quarterly Progress Report, Jul. - Sep. 1981

Oct. 1981 21 p refs

(Contract DE-AC22-80PC-30291)

(DE82-003061; DOE/PC-30291-4) Avail: NTIS HC A02/MF A01

The relationship between volatile matter production from pulverized coal and flame stabilization in a boiler environment was examined. The entire flow, optics and diagnostic systems were installed in the test cell and are operational. Problems with beam quality for the CO₂ laser were remedied by the design of a new beam splitting roof prism mirror. Coal is flowed in the presence of laser heating and the flow behaves qualitatively as expected. DOE

N83-15427# Oak Ridge National Lab., Tenn. CORROSION IN FRACTIONATION SYSTEMS

R. A. BRADLEY, J. R. KEISER, R. R. JUDKINS, V. B. BAYLOR, and J. H. DEVAN 1981 12 p refs Presented at the 6th Ann. Conf. on Mater. for Coal Conversion and Util., Gaithersburg, Md., 13 Oct. 1981

(Contract W-7405-ENG-26)

(DE82-001441; CONF-811061-3) Avail: NTIS HC A02/MF A01

All data collected to date suggest that chlorine, as water soluble chlorides, is necessary, albeit not sufficient, to cause the accelerated corrosion observed in pilot plant fractionation columns. Mechanisms for the transportation of chlorine to the fractionation columns, for the concentration of chlorine in these columns, and for the corrosion of the materials of construction of these columns are proposed. The source of the chlorine is the coal feed. When the coal is fed to the dissolver vessels, hydrogen chloride may be formed by volatilization or by hydrolysis of chloride salts followed

by volatilization. These amine hydrochlorides are transported in liquid streams to the fractionation area. Washing the coal liquids with water to remove the water soluble chlorides and the addition of certain amines are proposed as methods for reducing the corrosion. DOE

N83-15489# Southwest Research Inst., San Antonio, Tex. Fuels and Lubricants Research Lab.

ASSESSMENT/REVIEW OF METHANOL TECHNOLOGY AND UTILIZATION AS A FUEL Interim Report, Oct. 1981 - Sep. 1982

G. H. LEE, L. L. STAVINOH, and R. G. ZOSCHAK Jul. 1982 78 p refs

(Contract DAAK70-82-C-0001; DA PROJ. 1L7-62733-AH-20)

(AD-A120109; AFLRL-161; SWRI-6800-121) Avail: NTIS HC A05/MF A01 CSCL 07C

Alcohols, in particular methanol and ethanol, are currently being extensively studied for feasibility of use as neat fuels, fuel extenders, and/or octane improvers. This report provides a review of methanol technology and a preliminary assessment of its potential for use as a mobility/stationary equipment fuel. A high degree of technical feasibility has been indicated for both increased methanol production and use as a fuel, principally in burners, turbines, and spark ignition engines. Generally, the methanol fuel of choice for direct utilization is not neat methanol, but a methanol fuel containing materials such as isopentane or gasoline (up to 10 covol%) to improve cold start, volatility, and other fuel properties. Modifications of existing equipment are generally needed for direct use of fuel grade methanol except in fuel cells. Use of methanol at low concentrations as an additive or gasoline extender presents fewer problems of system corrosion and elastomer compatibility. A program to demonstrate the potential for utilization of methanol (both direct and as an extender) in DOD equipment has been recommended. Under this program, the Army would evaluate the equipment performance in various climates, test the equipment reliability/durability, and resolve related support questions on the safe and efficient storage, distribution, and use of methanol fuel. GRA

N83-15495# National Fertilizer Development Center, Muscle Shoals, Ala.

THE TENNESSEE VALLEY AUTHORITY'S BIOMASS FUELS PROGRAM

J. M. STINSON 1981 21 p refs Presented at Interagency Workshop on Biomass, Washington, D.C., 14-15 May 1981

(DE81-904161; CIRC-Z-120; CONF-8105119) Avail: NTIS HC

A02/MF A01

Information and processes that allow effective use of biomass (principally wood) by industry are investigated. Hardwoods are converted to ethanol by acid hydrolysis. An acid hydrolysis process which should decrease cost of production and improve process efficiency is studied. Direct combustion of wood in commercial and industrial furnace/boilers to replace oil and natural gas is feasible and is receiving considerable attention. Technical assistance is provided to encourage commercialization. Other activities include: (1) development of wood resource information and harvesting techniques; (2) determining productivity of nonwood biomass crops for ethanol production and potential land availability for biomass crops; (3) development of a farm scale fuel alcohol unit to utilize various nonwood feedstocks; and (4) marketing and distribution assessments. DOE

04 FUELS AND OTHER SOURCES OF ENERGY

N83-15496# Los Alamos Scientific Lab., N. Mex.
ANALYSIS OF PREBURN THREE-DIMENSIONAL FLOW PATTERNS IN UNDERGROUND COAL CONVERSION
 B. J. TRAVIS and H. E. NUTTALL (New Mexico Univ., Albuquerque) 1981 9 p refs Presented at the 7th Underground Coal Conversion Symp., Fallen Leaf Lake, Calif., 8-11 Sep. 1981 Sponsored in part by the Public Service Co. and Western Coal Co.
 (Contract W-7405-ENG-36)
 (DE82-002405; LA-UR-81-2933; CONF-810923-12) Avail: NTIS HC A02/MF A01

A three dimensional numerical study was performed to better elucidate the rather complex flow patterns that can occur during the bed preparation stage of underground coal gasification when the linked vertical well method is applied. The important effects of the 3-D geometry, gravity, anisotropy, pressure dependent permeability, and dynamic two phase air/water flow are discussed. For the first time the dynamic, 3-D growth of the air bubble (i.e., the dewatered region) is studied under simulated field conditions for western subbituminous coal. Interpretation of the 3-D flow and tracer patterns is an important element in an effective site characterization program. The numerical code used in these studies WAFE3D, was developed to compute multiphase, multicomponent mass and heat transport in porous/fractured geological media. The code solves the time dependent 3-D conservation equations for mass, momentum, and energy using an integrated finite difference implicit numerical scheme. DOE

N83-15497# Battelle Columbus Labs., Ohio.
POTENTIAL FOR USE OF PEAT BLENDS WITH COAL FOR ELECTRIC POWER GENERATION Final Technical Report, Apr. 1981
 D. ANSON, J. MURIN, and H. R. HAZARD 1981 115 p refs
 (Contract DE-AC18-80FC-10231)
 (DE82-003634; DOE/PC/10231-T1) Avail: NTIS HC A06/MF A01

The possible use of peat and coal blends in utility boilers was studied. From fuel and ash properties estimates were made of the changes from coal firing practice that would be required in boiler design and fuel preparation. Boiler fouling, slagging and efficiency effects were predicted and compared with behavior of plants operating on coal or peat alone. It is expected that blends containing 50 percent peat would require relatively minor design changes from coal firing practice, but the firing of peat calls for substantially different design approaches DOE

N83-15498# Los Alamos Scientific Lab., N. Mex.
METHANE HYDRATE GAS PRODUCTION: EVALUATING AND EXPLOITING THE SOLID GAS RESOURCE
 P. L. MCGUIRE 1981 23 p refs Presented at the 4th Intern. Conf. on Alternative Energy Sources, Miami Beach, Fla., 14-16 Dec. 1981
 (Contract W-7405-ENG-36)
 (DE82-004373; LA-UR-81-3461, CONF-811212-3) Avail: NTIS HC A02/MF A01

Two methods of producing gas from hydrate deposits by the injection of hot water or steam are discussed. The feasibility of hydraulic fracturing and pressure reduction as a hydrate gas production technique is discussed. A hydraulic fracturing technique suitable for hydrate reservoirs and a system for coring hydrate reservoirs are also described. DOE

N83-15499# Oak Ridge National Lab., Tenn Engineering Div.
MODIFICATION OF FEED/EFFLUENT FLOW WORK EXCHANGERS FOR SLURRY SERVICE AND POWER RECOVERY IN COAL LIQUEFACTION PROCESSES
 J. R. HORTON 1981 17 p Presented at the Winter Ann. Meeting of the ASME Technol. and Soc. Div., Washington, 15-19 Nov. 1981
 (Contract W-7405-ENG-26)
 (DE82-004114; Y/EN-511; CONF-811101-15) Avail: NTIS HC A02/MF A01

Process and equipment modifications necessary for application of modified flow work exchangers in coal liquefaction processes are reviewed. A discussion is provided on flow work exchanger-like devices such as the Pipefeeder and the Hydro-hoist. The benefits in minimizing the use of or elimination of critical and problem equipment in conventional coal liquefaction plants such as pressure letdown valves and large high head slurry pumps are compared with the most critical problems with slurry feed/effluent flow work exchangers. Performance of disc type slurry valves which are being considered for flow work exchangers in slurry service is discussed. A preliminary assessment of the cost/benefits of power recovery in coal liquefaction utilizing feed/effluent work flow exchangers is discussed.

N83-15628*# IMA Resources, Washington, D.C.
DESIGN AND FEASIBILITY STUDY FOR A PORTABLE OIL RECOVERY TURBOPUMP Final Report
 30 May 1982 65 p refs
 (Contract NAS8-34538)
 (NASA-CR-170704; NAS 1.26:170704) Avail: NTIS HC A04/MF A01 CSCL 13K

A portable oil recovery turbopump concept, using the Firefly module as primer mover, for the offloading of distressed tank vessels is examined. The demands to be met both in terms of the type of petroleum to be offloaded, as well as the operational requirements placed on the pump, are studied with respect to the capability of different pump configurations. Two configurations, one a centrifugal type and the other a screw type pump, are developed and evaluated. While the centrifugal configuration is found to be effective in a large proportion of tank vessel offloading situations, the screw type will be required where high viscosity cargoes are involved. The feasibility of the turbopump concept, with the Firefly module as prime mover, is established. Author

N83-15712# Tokyo Gas Co. Ltd. (Japan). Production and Engineering Dept.
THERMAL ANALYSIS OF THE POSITION OF THE FREEZING FRONT AROUND AN LNG IN-GROUND STORAGE TANK WITH A HEAT BARRIER
 O. WATANABE and M. TANAKA (Kajima Inst. of Construction Technology) In CRREL Proc. of the 3d Intern. Symp. on Ground Freezing p 3-10 1982 refs
 Avail: NTIS HC A20/MF A01 CSCL 08M

A technique of controlling the extent of the freezing zone created by in ground liquefied natural gas storage tanks by installing a heat barrier is described. The freezing conditions around three representative tanks after operating the system were compared. M.G.

N83-15732# Huainan Mining Coll. (China).
STUDY OF THE FREEZING PRESSURE ACTING ON A SHAFT LINING
 C. WANXI In CRREL Proc. of the 3d Intern. Symp. on Ground Freezing p 355-366 1982 refs
 Avail: NTIS HC A20/MF A01 CSCL 20K

The carboniferous layer in Panji coal mining district is almost completely covered by water bearing overburdens of varying thickness. The total thickness of soil overburdens is more than 200 m. For the sinking of shafts through this overburden the freezing method is employed. The reinforced concrete lining has been applied in Panji shafts. It is found that freezing pressure augments with the increase of depth of the soil, the distribution of which being uneven. The freezing pressure resulting from the

04 FUELS AND OTHER SOURCES OF ENERGY

deformation of the freezing wall is likely to give rise to the breaking of the reinforced concrete lining. Author

N83-15801# Sandia Labs., Albuquerque, N. Mex. MATERIAL PROPERTIES OF GREEN RIVER OIL SHALE

L. S. COSTIN Oct. 1981 40 p refs
(Contract DE-AC04-76DP-00789)
(DE82-003271; SAND-81-1457) Avail: NTIS HC A03/MF A01

A compilation of material property data on Green River (Piceance Basin) oil shale is presented. It is intended to provide a baseline of data to support various thermomechanical modeling efforts in progress. The data, presented in tabular form, are divided into three categories: elastic properties, failure properties and thermal properties. Within each category, the data are listed by kerogen content and test condition (confining pressure, temperature, etc.). Summaries of some of the important features of the elastic and failure properties of oil shale are presented in graphical form. DOE

N83-15802# Mound Lab., Miamisburg, Ohio. PHYSICAL AND CHEMICAL CHARACTERIZATION OF DEVONIAN GAS SHALE Quarterly Status Report, 1 Apr. - 30 Jun. 1981

R. E. ZIELINSKI and E. STACY 1981 51 p
(Contract DE-AC04-76DP-00053)
(DE82-002560; MLM-MU-81-66-0012; MLM-EGSP-TPR-Q-018)
Avail: NTIS HC A04/MF A01

Organic carbon contents were determined for samples from the OH-9 and NY-5 wells. The average total organic content for each well was 2.51 wt %, respectively. Visual kerogen assessments were also completed for the OH-9 and NY-5 wells. The average values for the total hydrocarbon yield, volatile hydrocarbon content, and Peak II maximum temperature were 0.94 wt %, 1688 ppm, and 459 deg C for OH-9. The samples from NY-5 averaged 0.22 wt % hydrocarbon, with approximately 77% of the total derived from Peak II production. The average vitrinite reflectance values for each well were 0.44 and 1.28, respectively suggesting an immature shale in OH-9 and a mature shale in NY-5. The bulk samples were predominately clay (42 to 45%), pyrite (12 to 26%), and quartz (28 to 36%) for OH-9, while the NY-5 samples contained clay (31 to 40%), pyrite (11 to 32%), and quartz (19 to 29%). DOE

N83-15803# Department of Energy, Bartlesville, Okla. Energy Technology Center.

CONTRACTS FOR FIELD PROJECTS AND SUPPORTING RESEARCH ON ENHANCED OIL RECOVERY AND IMPROVED DRILLING TECHNOLOGY Progress Review for quarter ending 30 Jun. 1981

B. LINVILLE, ed. Sep 1981 142 p refs
(DE82-002598; DOE/BETC-81/3; PR-27) Avail: NTIS HC A07/MF A01

Reports are presented of contracts for field projects and supporting research on chemical flooding, carbon dioxide injection, thermal/heavy oil, as well as for the following areas of research: resource assessment technology; extraction technology; environmental; microbial enhanced oil recovery; improved drilling technology; and general supporting research. DOE

N83-15805# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

CATALYTIC COMBUSTION WITH STEAM INJECTION

D. N. ANDERSON and R. R. TACINA 1982 15 p refs
Presented at the Joint Power Generation Conf., Denver, 17-21 Oct. 1982; sponsored by ASME
(NASA-TM-82923; E-1315; NAS 1.15:82923) Avail: NTIS HC A02/MF A01 CSCL 10B

The effects of steam injection on (1) catalytic combustion performance, and (2) the tendency of residual fuel to burn in the premixing duct upstream of the catalytic reactor were determined. A petroleum residual, no. 2 diesel, and a blend of middle and heavy distillate coal derived fuels were tested. Fuel and steam were injected together into the preheated airflow entering a 12

cm diameter catalytic combustion test section. The inlet air velocity and pressure were constant at 10 m/s and 600 kPa, respectively. Steam flow rates were varied from 24 percent to 52 percent of the air flow rate. The resulting steam air mixture temperatures varied from 630 to 740 K. Combustion temperatures were in the range of 1200 to 1400 K. The steam had little effect on combustion efficiency or emissions. It was concluded that the steam acts as a diluent which has no adverse effect on catalytic combustion performance for no. 2 diesel and coal derived liquid fuels. Tests with the residual fuel showed that upstream burning could be eliminated with steam injection rates greater than 30 percent of the air flow rate, but inlet mixture temperatures were too low to permit stable catalytic combustion of this fuel S.L.

N83-15910# Pacific Northwest Lab., Richland, Wash.

THE WIND CHARACTERISTICS PROGRAM

L. L. WENDELL /n Midwest Res. Inst. Fifth Bien. Wind Energy Conf. and Workshop (WW5) p 27-38 1981 refs
(Contract DE-AC06-76RL-01830)
Avail: NTIS HC A23/MF A01

Wind characteristics research activities emphasize wind resource assessment, site selection and evaluation techniques, and wind characteristics for wind turbine design, performance and operations evaluation. Wind resource analysis shows the greatest area of high wind power resource is in the midsection of the U.S. High wind power is available in other sections of the country and is described in some detail on a state by state basis in twelve regional atlases. To carry the wind prospecting process to a finer scale, site selection techniques for small and large wind turbines were developed, tested, and documented. There is a broad range of sophistication and reliability in these techniques and their application must be matched with the priorities and time available for energy planning efforts. The nature of wind gustiness was evaluated statistically and modeled for calculating fatigue cycles and extreme events S.L.

N83-15923# West Texas State Univ., Canyon. Alternative Energy Inst.

AGRICULTURAL APPLICATION OF SWECS

V. NELSON /n Midwest Res. Inst. Fifth Bien. Wind Energy Conf. and Workshop (WW5) p 227-236 1981 refs
Avail: NTIS HC A23/MF A01

Principal applications of wind energy for agriculture are (1) farmstead power, mainly electrical, (2) building heating, (3) irrigation pumping, (4) product storage and processing, (5) hot water for residences and dairies, and (6) associated industries of agribusiness such as feedlots, fertilizer elevators, greenhouses, etc. Field experiments show that wind energy is a viable alternative, however, reliability and maintenance are still major problems. Test results of the various experiments are described. S.L.

N83-15951# Sandia Labs., Albuquerque, N. Mex.

OIL-SHALE PROGRAM Quarterly Report, Apr. - Jun. 1981

B. E. BADER, ed. Oct. 1981 54 p refs
(Contract DE-AC04-76DP-00789)
(DE82-900588; SAND-81-1973; QR-22) Avail: NTIS HC A04/MF A01

The principal activities of the Sandia National Laboratories in the Department of Energy Oil shale program during the period April 1 to June 30, 1981 are discussed. Currently, Sandia's activities are focused upon: the development and use of analytical and experimental modeling techniques to describe and predict the retort properties and retorting process parameters that are important to the preparation, operation, and stability of in situ retorts, and the development, deployment, and field use of instrumentation, data acquisition, and process monitoring systems to characterize and evaluate in site up shale oil recovery operations. In-house activities and field activities (at the Geokinetics Oil Shale Project and the Occidental Oil Shale Project) are described under the headings: bed preparation, bed characterization, retorting process, and structural stability. DOE

04 FUELS AND OTHER SOURCES OF ENERGY

N83-15952# California Univ., Livermore. Lawrence Livermore Lab.

REACTION KINETICS AND DIAGNOSTICS FOR OIL-SHALE RETORTING

A. K. BURNHAM 19 Oct. 1981 32 p refs Presented at 2nd IGT Symp. on Synthetic Fuels from Oil Shale, Nashville, 26 Oct. 1981

(Contract W-7405-ENG-48)

(DE82-001598; UCRL-86794; CONF-811054-1) Avail: NTIS HC A03/MF A01

The advances in pyrolysis chemistry and kinetics and the resulting diagnostic methods based on effluent products for determining retort performance were reviewed. Kerogen pyrolysis kinetics and stoichiometry were generalized by further measurements on a larger number of samples. Analysis by capillary column gas chromatography of shale oil samples produced under a variety of field and laboratory conditions resulted in a method for determining the oil yield from a combustion retort. Measurement of sulfur products under a variety of conditions led to an understanding sulfur reactions both those of processing and environmental importance. Equations for estimating the heat of combustion of spent shale were developed by understanding oil shale composition and reactions. GRA

N83-15959# Atomic Energy Research Establishment, Harwell (England).

CORROSION TESTS IN THE MARCHWOOD GEOTHERMAL BOREHOLE

P. F. LAWRENCE Mar. 1982 23 p

(AERE-G-2225) Avail: NTIS HC A02/MF A01

Corrosion tests in the high salinity brine produced during a production test at the Marchwood borehole. These tests were intended to obtain preliminary information on the corrosion of a range of metals and alloys most likely to be used for downhole service, heat exchangers and associated equipment, if hot water from this aquifer is used to provide a long-term energy source. Specimens of appropriate candidate materials were exposed to flowing brine in the surface pipework and also downhole at a depth of 663 m. The brine was pumped to the surface by a multi-stage electric submersible pump. The downhole specimens, which were installed with the pump, were exposed for a period of 83 days. The surface specimens were exposed during the well production test for 33.3 days. The product brine was around three times sea water concentration, at a temperature of 72 C and pH 6.2. Author

N83-15965# Geological Survey, Washington, D. C.

THE GEOTHERMAL RESEARCH PROGRAM OF THE US GEOLOGICAL SURVEY

1982 18 p refs

(USGS-CIRC-862) Avail: NTIS HC A02/MF A01

The history of the geothermal research program of the U.S. geological survey is presented. N.W.

N83-16212# Geo-Centers, Inc., Newton, Mass.

EVALUATION OF PLASMA JET IGNITION FOR IMPROVED PERFORMANCE OF ALTERNATE FUELS Final Report, Feb. - Aug. 1982

J. F. GRANT, Z. GOLENKO, and M. E. MCILWAIN Aug. 1982 87 p refs

(Contract DAAK70-82-C-0047; DA PROJ. 1L1-62733-AH-20)

(AD-A120160; GC-TR-82-256) Avail: NTIS HC A05/MF A01

CSCL 21B

Alcohols, such as ethanol and methanol, are potential substitutes for gasolines during periods of fuel shortages. The pure alcohols have been reported to cause performance and starting problems when used to fuel internal combustion engines. This study characterized how three modes of ignition, OEM magneto, high energy conventional spark (CI) and plasma jet ignition (PJI) influenced the engine combustion properties of ethanol, methanol and gasoline alcohol blends. Specific combustion properties examined in these measurement were burning velocity and lean limit. In addition, the engine performance was determined

for 30% alcohol gasoline containing blends. These engine performance measurements determined brake power, brake specific fuel consumption and brake emissions of carbon monoxide and hydrocarbons. The findings of this study suggest that high energy ignition systems, such as plasma jet ignition, will improve both fuel combustion properties and engine performance. GRA

05

ENERGY CONVERSION

Includes thermomechanical, thermoelectric, geothermal, ocean thermal, and wind energy conversion. Also includes nuclear reactors, magnetohydrodynamic generators, and fuel cells.

A83-10641 -

ON THE OPTIMIZATION OF MAGNETIC FIELD SOURCES IN ELECTROMECHANICAL ENERGY CONVERSION

J.-M. BIEDINGER and M. KANT (Compiègne, Université de Technologie, Compiègne, France) Journal of Applied Physics, vol. 53, Oct. 1982, p. 7061-7070. Research supported by the Delegation Generale a la Recherche Scientifique et Technique. refs

This paper describes a numerical approach for the optimization of magnetic field sources, current distribution, and permanent magnets. The developments, based on the finite element method, consider two-dimensional, unsaturated models. As the criteria of optimization, the parameters representing the relationship existing between two Hermitian matrices are used. An application of this method, in the case of a single-sided, linear motor, permits a number of conclusions to be made concerning the shape of the windings and their power supply. This work may prove useful in the optimization of devices with nonconventional geometry and/or supplied by power electronics. (Author)

A83-10654#

GENERALIZED CHARACTERISTICS AND APPLICABILITY OF VARIOUS PROBABILITY DISTRIBUTIONS FOR WIND ENERGY APPLICATIONS

S. ESKINAZI and D. E. CRAMER (Syracuse University, Syracuse, NY) Journal of Energy, vol. 6, Nov.-Dec. 1982, p. 384-391. refs

The work in this paper attempts to show the presence of certain important general behavior characteristics of hourly wind speed variations in the atmospheric surface layer, in spite of differences that exist in site roughness, seasons, and thermal stability at each of the 28 different sites considered. Four different types of probability density distributions are matched (fitted) to a combination of the first four moments calculated from the real-time data of each of the nearly 100 site-months processed in this work. A new definition of 'best fit' is proposed; and on this basis, comparisons and recommendations are made. (Author)

A83-10656#

APPROACH TO NITINOL POWER PLANT COST ANALYSIS

J. L. MCNICHOLS, JR. (McDonnell Douglas Astronautics Co., Engineering Div., Huntington Beach, CA), J. S. CORY (Cory Laboratories, Escondido, CA), and E. H. CURTIS (U.S. Bureau of Reclamation, Office of Science and Technology, Washington, DC) Journal of Energy, vol. 6, Nov.-Dec. 1982, p. 399-405. refs

The objective of this paper is to provide a method for cost evaluation of low grade thermal energy conversion by Nitinol power plants. To accomplish this objective Nitinol power plant costs are subdivided into those which can be obtained through conventional cost analysis, and those which are associated with the Nitinol heat engine and are not subject to conventional analysis. Analytic expressions are provided for the Nitinol heat engine capital costs and Nitinol replacement costs in terms of Nitinol performance, heat engine configuration, plant operating factors, material costs, and the cost of capital. Nitinol working material factors are identified

that require further definition before firm and reliable costs can be determined. It is found that the Nitinol heat engine capital costs per unit power generating capacity are approximately \$0.15/W, and that the cost of produced energy for the Nitinol heat engine portion of the power plant is approximately 0.74¢/kWh, including operation, maintenance, Nitinol replacements and the cost of capital for the heat engine. It is concluded that Nitinol power plants for the conversion of low grade thermal energy may have a significant economical advantage over conventionally fueled power plants. (Author)

A83-10659#

LOADING SCHEMES FOR A 50 MWTH DIAGONALLY CONNECTED MHD GENERATOR

C. C. P. PIAN and A. M. DEMIRJIAN (Avco Everett Research Laboratory, Inc., Everett, MA) *Journal of Energy*, vol. 6, Nov.-Dec. 1982, p. 418-424. refs
(Contract DE-AC01-80ET-15614)

(Previously cited in issue 06, p. 946, Accession no. A82-17923)

A83-10661#

PERFORMANCE OF THE WELLS TURBINE AT STARTING

S. RAGHUNATHAN (Belfast, Queen's University, Belfast, Northern Ireland) and C. P. TAN *Journal of Energy*, vol. 6, Nov.-Dec. 1982, p. 430, 431. Research supported by the Department of Energy of England.

A practical problem encountered with the Wells self-rectifying axial flow turbine is its difficulty in running up to operational speed when started from rest, a phenomenon called 'crawling'. Attention is given to the influence of hub-to-tip ratio and rotor solidity on both starting and efficiency, and it is determined that to avoid crawling, a high rotor solidity and low hub-to-tip ratio, both of the order of 0.6, are required. O.C.

A83-10665*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

END REGION EFFECTS UPON THE PERFORMANCE OF A MAGNETOHYDRODYNAMIC CHANNEL

S. Y. WANG and J. M. SMITH (NASA, Lewis Research Center, Cleveland, OH) *Journal of Energy*, vol. 6, Nov.-Dec. 1982, p. 438, 439.

(Previously cited in issue 06, p. 945, Accession no. A82-17889)

A83-10675

THE THEORY OF AIRCRAFT ENGINES [TEORIJA AVIATSIONNYKH DVIGATELEI]

S. I. LOVINSKII Moscow, Izdatel'stvo Mashinostroenie, 1982. 224 p. refs

Gas turbine engines used in modern aircraft are reviewed with reference to the main engine components, the principles of engine operation, basic performance characteristics, and engine operation analysis. The engine components examined include air intake devices, various types of compressors, combustion chambers, gas turbines, and exit nozzles. Among other topics the discussion covers specific engine parameters in relation to cycle variables, engine efficiency and energy balance, operation modes, thermal and gas dynamic analyses, and approximate computation of velocity and altitude characteristics. V.L.

A83-11021

POWER CONDITIONING UNIT DEVELOPMENT FOR MAG-TRANSIT

R. G. GILLILAND and R. J. SMITH (Boeing Aerospace Co., Automated Transportation Systems, Seattle, WA) In: *PESC '81: Power Electronics Specialists Conference*, Boulder, CO, June 29-July 3, 1981, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 297-301. Research supported by U.S. Department of Transportation.

The results of a development program which has been completed on a modular inverter, referred to as the Power Conditioning Unit (PCU), employing many parallel TO-3 transistors,

are discussed. The PCU has been designed to provide a precisely controlled, variable voltage, variable frequency excitation to a linear induction motor in the MAG-TRANSIT system, a form of magnetically levitated vehicles for people mover applications. The CPU, which consists of eight power modules, with 24 transistors each, has demonstrated a capacity of 73.4 kVA. V.L.

A83-11777

WIND TURBINE BLADES: A STUDY OF PROTOTYPES IN A STEADY REGIME - UNSTEADY CONSIDERATIONS [HELICES EOLIENNES: ETUDE DE PROTOTYPES EN REGIME STATIONNAIRE - ASPECTS INSTATIONNAIRES]

R. LEBLANC, R. GOETHALS (Ecole Nationale Supérieure de Mécanique et d'Aérotechnique, Poitiers, France), and B. DE SAINT LOUVENT (Météorologie Nationale, Etablissement d'Etude et de Recherche, Paris, France) *Association Aeronautique et Astronautique de France, Colloque d'Aérodynamique Appliquée*, 18th, Poitiers, France, Nov 18-20, 1981, 66 p. In French. refs (AAAF PAPER NT 81-17)

The results of comparisons of numerical models with experimental results for the performance of prototype wind turbines in steady flows are presented, along with preliminary results on behavior in unsteady flows. The numerical models are based on previous schemes devised for propellers, with modifications for small perturbations, significant radial velocity effects from the wake, and the fact that the speed is induced. Two computational methods are currently used, one a method of short blades, the other the Prandtl lifting line theory. Trials have been run in the T4 wind tunnel using a 3 m horizontal axis machine and a 2.5 m Darrieus. Attention is given to modeling the structural dynamics and turbulent flow structures encountered by wind turbines. Experimental results relating windspeed, angle of attack, and output are presented. Optimization studies have indicated that wind farms will require a 6-7 blade diameter unit spacing to maintain satisfactory group output efficiencies. M.S.K.

A83-11837

NUCLEAR ENERGY IN SPACE [KERNENERGIE IM WELTRAUM]

H. LOEB (Giessen, Universität, Giessen, West Germany) *Atomkernenergie/Kerntechnik*, vol. 40, no. 1, 1982, p. 23-30. In German. refs

The electric onboard power requirements of spacecraft have steadily increased since the launching of the first spacecraft, and power requirements of earth satellites as high as 10 kW are currently observed. Since the early 1960s, nuclear power installations in space have been used by the U.S. and the Soviet Union in connection with electric power requirements which cannot be satisfied by solar cells. Such requirements are related to flights to the outer planets and the operation of spacecraft in the lunar or planetary shadow (including the shadow of the earth). Possibilities for the use of nuclear energy in space are discussed, and the employment of radioisotope batteries is considered. Questions regarding the employment of nuclear reactors in space are also investigated, taking into account principles of operation, and aspects of technical implementation. The operation of nuclear propulsion systems is also described. G.R.

A83-11868

THE REBIRTH OF THE RANKINE CYCLE - ENERGY PRODUCTION ON THE BASIS OF LOW- AND MEDIUM-TEMPERATURE HEAT SOURCES [LE RENOUVEAU DU CYCLE DE RANKINE - LA PRODUCTION D'ENERGIE A PARTIR DE SOURCES DE CHALEUR A BASSE ET MOYENNE TEMPERATURES]

A. JAUMOTTE *Académie des Sciences (Paris), Comptes Rendus, Vie Académique*, vol. 292, Apr. 27, 1981, p. 99-121. In French. Research supported by the Services de la Programmation de la Politique Scientifique, and Commission of the European Communities. refs

It is noted that there is renewed interest in the Rankine cycle for energy production on the basis of low- and medium-temperature heat sources. The organic-fluid Rankine cycle is shown to be

05 ENERGY CONVERSION

promising for power outputs less than or of the order of 1 MW; in particular, the use of freon at temperatures below 150 C is considered. A free-piston refrigerating machine operating on the basis of nonconcentrated solar energy according to the double Rankine cycle is noted as a simple, reliable, low-cost machine. At power outputs higher than 1 MW, ammonia is a working fluid of interest at low temperatures, the binary water-ammonia cycle for nuclear or fossil-fuel power plants is especially noteworthy B J.

A83-11952

COMPUTATIONAL MODEL OF A DIFFUSE DISCHARGE ON ELECTRODES IN A WEAKLY IONIZED PLASMA [RASCHETNAIA MODEL' DIFFUZNOGO RAZRIADA NA ELEKTRODAKH V SLABOIONIZOVANNOI PLAZME]

M. S. BENILOV, V. I. KOVBASIUK, and G. A. LIUBIMOV (Akademii Nauk SSSR, Institut Vysokikh Temperatur, Moscow, USSR) Akademii Nauk SSSR, Doklady, vol. 266, no. 4, 1982, p. 812-816. In Russian refs

A83-12056

SPECTROSCOPIC STUDIES OF THE HAZARDS OF LI/SOCL₂ BATTERIES DURING ANODE-LIMITED CELL REVERSAL

D. J. SALMON, M. E. PETERSON, L. L. HENRICKS, L. L. ABELS, and J. C. HALL (Gould Laboratories, Rolling Meadows, IL) Electrochemical Society, Journal, vol. 129, Nov. 1982, p. 2496-2499. refs

Experimental evidence is adduced which indicates that chlorine monoxide is formed during reversal of anode-limited Li/SOCl₂ cells. Chlorine monoxide is known to be an explosive compound, and may account for explosions reported in anode-limited cells in the event that the conditions for detonation, including concentration, contact with an organic compound, and possibly contact with an initiator, are present. The uncertainty of satisfying these conditions may account for the reported unpredictability of cell explosions.

O.C.

A83-12466* Hughes Research Labs., Malibu, Calif.

ADVANCES IN SERIES RESONANT INVERTER TECHNOLOGY AND ITS EFFECT ON SPACECRAFT EMPLOYING ELECTRIC PROPULSION

R. R. ROBSON (Hughes Research Laboratories, Malibu, CA) AIAA, Japan Society for Aeronautical and Space Sciences, and DGLR, International Electric Propulsion Conference, 16th, New Orleans, LA, Nov. 17-19, 1982, AIAA 5 p refs (Contract NAS3-22471; NAS3-23159) (AIAA PAPER 82-1881)

The efficiency of transistorized Series Resonant Inverters (SRIs), which is higher than that of silicon-controlled rectifier alternatives, reduces spacecraft radiator requirements by 40% and may eliminate the need for heat pipes on 30-cm ion thruster systems. Recently developed 10- and 25-kW inverters have potential applications in gas thrusters, and represent the first spaceborne SRI designs for such power levels. Attention is given to the design and control system approaches employed in these inverter designs to improve efficiency and reduce weight, along with the impact of such improved parameters on electric propulsion systems. O.C.

A83-13460

CRYO-COOLER DEVELOPMENT FOR SPACE FLIGHT APPLICATIONS

R. E. HARRIS, J. E. CHENOWETH, and R. WHITE (USAF, Flight Dynamics Laboratory, Wright-Patterson AFB, OH) In: Infrared astronomy - Scientific/military thrusts and instrumentation, Proceedings of the Meeting, Washington, DC, April 21, 22, 1981. Bellingham, WA, SPIE - The International Society for Optical Engineering, 1981, p. 71-76. refs

Several types of cryogenic cooling systems for the focal planes and optical elements in sensors aboard orbiting spacecraft have been developed. (1) The cryogenic radiator is very reliable and requires no power consumption although it does not cool below 40 K and has a limited capacity (2) The Vuilleumier cooler has moderate efficiency but it is difficult to detach the cold section and there is a problem of wearing parts. (3) The turbo-cooler has

gas film bearings, a detached cold section and a large cooling capacity, but has poor efficiency in small sizes. (4) The rotary reciprocating refrigerator has good efficiency, little vibration and a detached cold section, but it is a complex machine with complex electronics. (5) The Stirling cooler with magnetic bearings and clearance seals is highly efficient but requires a counter-mass balance system and complex electronics for its magnetic bearings S.C.S.

A83-13650

A REVIEW OF UK WIND ENERGY ACTIVITIES

P. J. MUSGROVE (Reading University, Reading, Berks., England) International Journal of Solar Energy, vol. 1, no. 2, 1982, p. 145-160 refs

Wind power activities in Great Britain are reviewed, including a brief summary of historical windmill usage and details of developmental efforts in large and small wind turbines. An annual average resource of 5 m/sec at 10 m has been extrapolated to predict an 8-10 m/sec resource at the hub heights of large wind turbines. Initial estimates indicate that at least half of Great Britain's annual electricity consumption can be produced from windpowered generators. The potential of offshore large WECS siting is being examined, although the wind-derived electricity from those regions are projected to cost three times that of land-based operation. Recorded wind patterns with 12-48 hr duration have indicated that at least 20% penetration into the national grid is acceptable. A test 250 kW machine is being built as a model for a 3.7 MW machine, both intended for installation at Orkney, Scotland. Additionally, construction has begun on a 25-m diameter, vertical axis, variable geometry Musgrove wind turbine. The straight-bladed machine will produce a maximum of 130 kW, and is a prototype of multi-MW offshore units.

M.S.K.

A83-13695

THE SPECTRUM OF WIND SPEED FLUCTUATIONS ENCOUNTERED BY A ROTATING BLADE OF A WIND ENERGY CONVERSION SYSTEM

J. R. CONNELL (Battelle Pacific Northwest Laboratories, Richland, WA) Solar Energy, vol. 29, no. 5, 1982, p. 363-375 refs (Contract DE-AC06-76RL-01830)

The results of anemometer, hot-wire anemometer, and laser anemometer array and crosswind sampling of wind speed and turbulence in an area swept by intermediate-to-large wind turbine blades are presented, with comparisons made with a theoretical model for the wind fluctuations. A rotating frame of reference was simulated by timing the anemometric readings at different points of the actuator disk area to coincide with the moment a turbine blade would pass through the point. The hot-wire sensors were mounted on an actual rotating boom, while the laser scanned the wind velocity field in a vertical crosswind circle. The midfrequency region of the turbulence spectrum was found to be depleted, with energy shifted to the high end of the spectrum, with an additional peak at the rotation frequency of the rotor. A model is developed, assuming homogeneous, isotropic turbulence, to reproduce the observed spectra and verify and extend scaling relations using turbine and atmospheric length and time scales. The model is regarded as useful for selecting wind turbine hub heights and rotor rotation rates. M.S.K.

A83-13696* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio

A REVIEW OF RESONANCE RESPONSE IN LARGE, HORIZONTAL-AXIS WIND TURBINES

T. L. SULLIVAN (NASA, Lewis Research Center, Cleveland, OH) Solar Energy, vol. 29, no. 5, 1982, p. 377-383. refs (Previously announced in STAR as N82-23711)

1 t No.

A83-14041

BATTERIES AND FUEL CELLS: DESIGN, EMPLOYMENT, CHEMISTRY [BATTERIEN UND BRENNSTOFFZELLEN: AUFBAU, VERWENDUNG, CHEMIE]

K.-J. EULER (Kassel, Gesamthochschule, Kassel, West Germany) Berlin, Springer-Verlag, 1982. 217 p. In German refs \$28.50

The history of electrochemical current sources is considered along with primary cells, standard cells, high-energy primary cells, high-energy storage batteries, and fuel cells. Aspects of battery research and development are also discussed, taking into account general considerations related to technological development projects, the introduction of mathematical methods into battery research, resistance measurements, autoradiography and other radiochemical methods, color photography as an aid in research, electron microscopy, X-ray and electron diffraction, spin resonance methods, and electrical measurements involving powders. Attention is given to zinc/manganese dioxide cells, zinc/mercury cells, zinc/silver oxide primary cells, cells utilizing atmospheric oxygen, lead-acid batteries, nickel-iron and nickel-cadmium storage batteries, zinc/silver storage batteries, dry cells with organic depolarizers, dry cells with solid electrolyte, and storage batteries utilizing hydrogen. G.R.

A83-14115

ELECTRIC POWER SUPPLY OF AIRCRAFT [ELEKTROSNABZHENIE LETATEL'NYKH APPARATOV]

I. M. SINDEEV Moscow, Izdatel'stvo Transport, 1982. 272 p. In Russian. refs

Power supply systems of aircraft are reviewed with reference to their design, principles of operation, and maintenance. In particular, consideration is given to the drive systems of aircraft power generators, frequency and voltage control, static current converters, batteries, and power control, protection, and distribution systems. Methods of increasing the reliability of aircraft power supply systems are discussed. V.L.

A83-14725#

POWER AUGMENTATION IN A SAVONIUS-TYPE WIND-TURBINE BY USING A SINGLE AIR-DEFLECTING VANE S. SIVAPALAN and S. SIVASEGARAM (Peradeniya, University, Peradeniya, Sri Lanka) Regional Journal of Energy, Heat and Mass Transfer, vol. 4, July 1982, p. 187-193. refs

This paper deals with the increase of power output from a vertical-axis wind-turbine of the Savonius-type by using a single deflector vane of simple geometry. Vanes of plane and circular arc sections were used in the study. The respective influences of vane arc angle, vane size and angle of setting of the vane relative to the rotor on the power output were studied and so was the sensitivity of power output to wind direction. Power augmentation by over 50% is seen possible with a single vane of modest size. Means of further power augmentation and achievement of direction-independent operation are discussed. (Author)

A83-15797

CHARACTERISTICS OF A SAVONIUS WINDMILL POWER SYSTEM WITH A SYNCHRONOUS GENERATOR

T. SUZUKI and H. OKITSU (Tokushima, University, Tokushima, Japan) Wind Engineering, vol. 6, no. 3, 1982, p. 131-139. refs

This paper discusses the performance characteristics of a Savonius wind turbine power system with a synchronous generator. The theoretical results agree comparatively well with the experimental results. The effects of changes in wind speed and load resistance on the performance are discussed. (Author)

A83-15867

ZINC ELECTRODE MORPHOLOGY IN ALKALINE SOLUTIONS. I - STUDY OF ALTERNATING VOLTAGE MODULATION ON A ROTATING DISK ELECTRODE

D.-T. CHIN, R. SETHI (Clarkson College of Technology, Potsdam, NY), and J. MCBREEN (Brookhaven National Laboratory, Upton, NY) (Electrochemical Society, Meeting, Minneapolis, MN, May 10-15, 1981.) Electrochemical Society, Journal, vol. 129, Dec. 1982, p. 2677-2685. refs (Contract NSF ENG-77-25153)

The behavior and morphology of a zinc rotating disk electrode charged with superimposed square-wave alternating voltage (AV) in a concentrated alkaline zincate solution have been investigated with an AV-modulation technique. The study covered a range of AV from 0 to 200 mV rms and of frequency from 1 to 100 Hz. At low cathodic d-c overpotentials normally encountered in battery operations, AV greatly improved the current distribution and changed the nonadherent mossy zinc deposit into a compact epitaxial deposit. At higher cathodic d-c overpotentials, the effect of AV diminished; however, superimposition of AV seemed to widen the potential region for the growth of epitaxial deposit. For the anodic dissolution reaction, AV was found to increase the incidence of pitting corrosion. In addition, AV behaved as a depolarizer and substantially increased the d-c current density in the voltammetry measurements. (Author)

A83-15869

THE EFFECT OF THICKNESS ON THE PERFORMANCE OF MOLTEN CARBONATE FUEL CELL CATHODES

L. J. BREGOLI and H. R. KUNZ (United Technologies Corp., Power Systems Div., South Windsor, CT) Electrochemical Society, Journal, vol. 129, Dec. 1982, p. 2711-2715. Research supported by the Electric Power Research Institute. refs

Polarization data were obtained for the reduction of oxygen on porous lithiated nickel oxide fuel cell cathodes in lithium-potassium carbonate electrolyte at 650 C. Cathode thickness was varied from 0.013 to 0.112 cm with the maximum performance occurring for cathodes of approximately 0.08 cm thickness. The polarization data were optimized for each electrode by varying the electrode electrolyte content in a half-cell apparatus. The optimum content occurred when the combination of internal ionic resistive, diffusional, and activation losses resulted in minimum overvoltage. (Author)

A83-15909

A RELATIVISTIC PLASMA MICROWAVE GENERATOR [RELATIVISTSKII PLAZMENNYYI SVCH GENERATOR]

M. V. KUZNEV, F. KH. MUKHAMEDZIANOV, M. S. RABINOVICH, A. A. RUKHADZE, P. S. STRELKOV, and A. G. SHKVARUNETS (Akademiia Nauk SSSR, Fizicheskii Institut, Moscow, USSR) Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki, vol. 83, Oct. 1982, p. 1358-1367. In Russian. refs

Experiments are described that were aimed at achieving a microwave generator based on the interaction of a relativistic electron beam and a plasma. Results are presented for measurements of the microwave radiation parameters (wavelength, field structure, and radiant power) as a function of the beam and plasma parameters. Conditions for optimum generation in the centimeter range are determined, and a gain of 20% at a radiant power of about 100 MW is reported. The experimental results are shown to be in agreement with theoretical results obtained using a model with an infinitely strong magnetic field. F.G.M.

A83-16000

TEST RESULTS OF A MEDIUM TEMPERATURE SOLAR ENGINE

G. ANGELINO, M. GAIA, E. MACCHI (Milano, Politecnico, Milan, Italy), A. BARUTTI, C. MACCIO, and G. TOMEI (Ansaldo Impianti S.p.A., Genoa, Italy) International Journal of Ambient Energy, vol. 3, July 1982, p. 115-126. refs

Design features, philosophy, and experimental results with a fluorinated organic fluid solar engine for producing 35 kWe are described. The organic fluid was chosen because of the relatively

05 ENERGY CONVERSION

higher efficiencies offered in comparison with other solar thermal fluid cycles. The system comprised parabolic trough collectors, a 35 kWe generator, perfluoro-dimethylcyclohexane as the working fluid, heat exchangers, regenerator, vaporizer, and condenser. A refrigerated trap was installed downstream of the incondensable extractor for recuperating the working fluid. The working fluid temperature was nominally 220-265 C at 9-14 bar pressure during trials. The total system efficiency averaged around 21 percent at a 250 C cycle temperature. Use of a larger, dc generator is suggested to offer efficiency improvements. M.S.K

A83-16019

EMISSION CHARACTERISTICS OF REFRACTORY MATERIALS [EMISSIONNYE KHARAKTERISTIKI TUGOPLAVKIKH MATERIALOV]

O. S. VOROB'EV, M. G. DOMARIN, V. B. ELISEEV, A. N. ERMILOV, I. V. ORFANOV, and S. V. RIABIKOV. *Akademiia Nauk SSSR, Izvestiia, Energetika i Transport*, Sept.-Oct. 1982, p. 165-168. In Russian. refs

Electron emission processes of refractory materials in an air plasma stream are considered. Results are presented from experimental investigations of a stream produced by an electric-arc heater of high enthalpy. It is found that in many cases the density of the emission current is unusually high. A procedure is outlined for evaluating the emission efficiency of the electrodes from an analysis of the experimental volt-ampere characteristic of a two-electrode system. C.R.

A83-16026

MOMENTUM THEORY, DYNAMIC INFLOW, AND THE VORTEX-RING STATE

D. A. PETERS (Washington University, St. Louis, MO) and S.-Y. CHEN. *American Helicopter Society, Journal*, vol. 27, July 1982, p. 18-24.

A more unified approach to the solution of the vortex ring state problem is obtained through the extension of criteria for the state's boundary formulated by Wolkovitch (1972). These criteria are compared with the induced flow instability of Peters (1974), and results are obtained showing a strong correlation between momentum considerations, vortex considerations, and the theory of dynamic inflow. The vortex ring state is defined as the region in which the concept of a momentum slipstream is no longer valid, and may include both helicopter and windmill conditions. O.C.

A83-16101#

THERMIONICALLY EMITTING COPPER CATHODE IN CONTACT WITH COMBUSTION PLASMAS

G. V. R. RAJU, R. P. DAHIYA, and B. GUPTA (Indian Institute of Technology, New Delhi, India). *Journal of Energy*, vol. 7, Jan.-Feb. 1983, p. 3-9. Research supported by the Council of Scientific and Industrial Research of India. refs

Current density and electrode potential drops have been investigated using a copper cathode inserted in potassium seeded combustion products of liquefied-petroleum-gas and oxygen. The work function of the composite cathode surface, formed owing to enhanced seed deposition on the inserted electrode, is observed to be much lower than the work function of pure copper. This leads to large thermionic emission of electrons from the composite cathode surface and hence, a sharp decrease in cathode potential drop. Consequently, a high current density could be sustained in the diffusive mode of current conduction. The experimental observations are found to be in reasonably good agreement with a theoretical model developed taking into account the thermionic emission of electrons. (Author)

A83-16102#

AERODYNAMIC PLATFORM COMPARISON FOR JET-STREAM ELECTRICITY GENERATION

C. A. J. FLETCHER, A. J. HONAN, and J. S. SAPUPPO (Sydney, University, Sydney, Australia). *Journal of Energy*, vol. 7, Jan.-Feb. 1983, p. 17-23. Research supported by the Energy Authority of New South Wales. refs

Various aerodynamic platforms are considered for suitability for deriving electricity through wind turbines placed in the jet stream. Wind tunnel, economic, and performance analyses were performed for the integrated diffuser augmented wind turbine (IDAWT), the separated DAWT (SDAWT), a separated unshrouded wind turbine (SUWT), and a rotary wing concept (RWC). The wind tunnel trials were run with models and half models of the concepts to test the lift, static stability, and power extraction capability in a 25 m/sec flow. Variations in lift at varying angles of attack were also studied. The results indicated that the SDAWT and the IDAWT could be built at \$650/kW and produce power at an operating cost of \$.05/kWh. Improvements are projected to reduce the costs to \$550/kW installed with operating costs less than \$.04/kWh. The rotary wing concept was ruled out as a candidate. M S K

A83-16103#

NOX FORMATION EXPERIMENTS IN AN MHD SIMULATION FACILITY

A. G. WEHR and R. TANG (Mississippi State University, Mississippi State, MS). *Journal of Energy*, vol. 7, Jan.-Feb. 1983, p. 24-28. (Contract DE-AC02-80ET-15601)

(Previously cited in issue 07, p. 1112, Accession no. A81-20603)

A83-16104#

INFLOW DISK GENERATOR FOR OPEN-CYCLE MHD POWER GENERATION

T. NAKAMURA, W. E. LEAR, and R. H. EUSTIS (Stanford University, Stanford, CA). *Journal of Energy*, vol. 7, Jan.-Feb. 1983, p. 29-42. Research supported by the Electric Power Research Institute. refs

(Contract DE-AC01-80ET-15611)

(Previously cited in issue 07, p. 1162, Accession no. A81-20700)

A83-16105#

THE STD/MHD CODES - COMPARISON OF ANALYSES WITH EXPERIMENTS

A. A. VETTER, C. D. MAXWELL, and S. T. DEMETRIADES (STD Research Corp., Arcadia, CA). *Journal of Energy*, vol. 7, Jan.-Feb. 1983, p. 50-56. refs

(Contract EX-76-C-01-2243)

(Previously cited in issue 08, p. 1451, Accession no. A80-23953)

A83-16106#

STUDY OF ELECTRICAL FAULTS IN MAGNETOHYDRODYNAMIC FARADAY GENERATORS

S. KUO and E. LEVI (New York, Polytechnic Institute, Farmingdale, NY). *Journal of Energy*, vol. 7, Jan.-Feb. 1983, p. 57-64. Research supported by the Electric Power Research Institute. refs

(Contract ET-78-C-01-3084)

An equivalent circuit for modeling the Faraday channel is derived and used to study electrical faults external to the channel. Three faults, short circuit of one load, one load rejection, and short circuit between two adjacent anode electrodes, are considered. Numerical solutions of each fault case for the dimensions and parameters of AVCO's Mark VI facility and a projected base load plant are obtained. It is shown that short circuit of one load is the most dangerous fault in all cases and that one load rejection, while of no consequence in a small channel, could cause interelectrode arcing in a base load channel. (Author)

A83-16107#

COUPLED THREE-DIMENSIONAL FLOW AND ELECTRICAL CALCULATIONS FOR FARADAY MHD GENERATORS

S. P. VANKA and R. K. AHLUWALIA (Argonne National Laboratory, Argonne, IL) Journal of Energy, vol. 7, Jan.-Feb. 1983, p. 65-72. Research supported by the U.S. Department of Energy. refs

(Previously cited in issue 17, p. 3011, Accession no. A81-38093)

A83-16108#

MATHEMATICAL MODEL FOR THE ANALYSIS OF WIND-TURBINE WAKES

M.-K. LIU, M. A. YOCKE, and T. C. MYERS (Systems Applications, Inc., San Rafael, CA) Journal of Energy, vol. 7, Jan.-Feb. 1983, p. 73-78. refs

The concept of wind farms with clustered wind turbines at a given site seems to offer an attractive means for extracting wind power on a large scale. Techniques for minimizing the effect of upstream wind-turbine wakes on downstream wind turbines are needed to optimize overall performance of the wind-turbine array. A numerical model for prediction of the interaction of the wind turbine with the prevailing wind flow is described. The model is based on a numerical solution of the three-dimensional Navier-Stokes equations for the planetary boundary layer with the hydrostatic approximation. Three different hypothetical wind-turbine configurations are analyzed to demonstrate the utility of this model. Model predictions from the present study compare favorably with the basic characteristics of measured wind-turbine wakes

(Author)

A83-16110#

EXTREMAL MHD GENERATOR

V. THIAGARAJAN (Ebasco Services, Inc., New York, NY) Journal of Energy, vol. 7, Jan.-Feb. 1983, p. 88-90

A variational criterion is derived for extremal magnetohydrodynamic generators which can be used instead of the conventional constant velocity or other design criteria. The proposed variational criterion yields a range of designs which result in improved power output (and hence enthalpy extraction) with the same conditions at the inlet and exit of the generator. V.L.

A83-16111#

ON THE ROTARY WING CONCEPT FOR JET STREAM ELECTRICITY GENERATION

C. A. J. FLETCHER (Sydney University, Sydney, Australia) Journal of Energy, vol. 7, Jan.-Feb. 1983, p. 90-92. Research supported by the Energy Authority of New South Wales.

The limits imposed on rotor orientation, in rotary wing platforms for extracting energy from the jet stream, by the load carrying capability of Kevlar tethers used to anchor the platforms and conduct electricity were analyzed. The requirements of lift and power generation were analyzed by a blade element method to determine the power coefficient at various angles of attack. Optimal rotor radii were calculated for a platform generating 2.2 MWe for a set of tether angles, taking into account all the forces acting on the platform and rotors and also the weight of the platform. The platform weight and size was found to increase with the tether angle, with the minimum size (and costs) associated with a zero tether angle. Acceptable tether angles are determined to lie between 45-65 deg, so that the tether can support its own weight. It is concluded that the energy extraction method, using a rotary wing platform, is not feasible. M.S.K.

A83-16112#

TRANSFORMATION OF WIND ENERGY BY A HIGH-ALTITUDE POWER PLANT

G. RIEGLER, W. RIEDLER, and E. HORVATH (Graz, Technische Universität, Graz, Austria) Journal of Energy, vol. 7, Jan.-Feb. 1983, p. 92-94. refs

(Previously cited in issue 03, p. 399, Accession no. A82-14025)

A83-16664#

DESIGN OF A LOW EMISSION COMBUSTOR FOR AN AUTOMOTIVE GAS TURBINE

J. W. SANBORN, H. C. MONGIA, and J. R. KIDWELL (Garrett Turbine Engine Co., Phoenix, AZ) American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 21st, Reno, NV, Jan. 10-13, 1983, 9 p.

(AIAA PAPER 83-0338)

The design of a lean-burn low-emission combustor for a regenerative automotive gas turbine engine, including detailed analysis and element testing to improve premixing of fuel and air to minimize NOx emissions is described. The measured emission levels for the various configurations tested are presented along with a brief description of the resulting full-scale combustion system. (Author)

A83-16690#

PERFORMANCE RESULTS OF A 300 MWTH GENERATOR AT HIGH MAGNETIC FIELD

L. S. CHRISTENSEN, G. L. WHITEHEAD, and E. J. FELDERMAN (Calspan Field Services, Inc., Arnold Air Force Station, TN) American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 21st, Reno, NV, Jan. 10-13, 1983, 11 p. Research sponsored by the U.S. Department of Energy and Calspan Field Services, Inc. refs

(AIAA PAPER 83-0394)

The High Performance Demonstration Experiment (HPDE) in progress at AEDC has as its objective a 300 MW thermal input open-cycle MHD system has been assembled. Testing with the channel configured in the Faraday mode was initiated in late 1979. Experimental results have been obtained at a magnetic field strength from 1.5 to 3.8 Tesla (T). A maximum Faraday power of 35.5 MW has been generated, which represents an enthalpy extraction of 11.6 percent. (Author)

A83-16691*# Texas Univ., Arlington.

TRANSIENT FLOW ANALYSIS OF THE AEDC/HPDE MHD GENERATOR

D. R. WILSON, Y. M. LEE (Texas University, Arlington, TX), and C. S. STEWART (General Dynamics Corp., Fort Worth, TX) American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 21st, Reno, NV, Jan. 10-13, 1983, 10 p. refs (Contract NSG-3255)

(AIAA PAPER 83-0395)

A hybrid Lax-Wendroff/Method of Characteristics computer code has been developed for numerical simulation of flow transients associated with the operation of MHD generator facilities. The code employs the shock-fitting method, with an Eulerian formulation of the basic conservation equations and explicit tracking of shock waves. Pressure, temperature, and velocity are used as primary integration variables to simplify interfacing of the code with real-gas thermodynamic and transport property tables. Application of the code to the simulation of selected transients for the AEDC/HPDE MHD generator produced results that are in good agreement with experimental observations. (Author)

A83-16732#

THREE-DIMENSIONAL FLUID AND ELECTRODYNAMIC MODELING FOR MHD DCW CHANNELS

B. L. LIU, J. T. LINEBERRY, and H. J. SCHMIDT (Tennessee University, Tullahoma, TN) American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 21st, Reno, NV, Jan. 10-13, 1983, 12 p. refs

(Contract DE-AC02-79ET-10815)

(AIAA PAPER 83-0464)

A three dimensional, numerical solution for modeling diagonal conducting wall (DCW) magnetohydrodynamic (MHD) generators is developed and discussed. Cross plane gasdynamic and electrodynamic profiles are computed considering coupled MHD flow and electrical phenomena. A turbulent transport model based on the mixing length theory is used to deal with wall roughness generated turbulence effects. The infinitely fine electrode segmentation formulation is applied to simplify the governing

05 ENERGY CONVERSION

electrical equations. Calculations show the development of distorted temperature and velocity profiles under influence of magnetohydrodynamic interaction. Since both sidewall and electrode wall boundary losses are treated, the results furnish a realistic representation of MHD generator behavior. (Author)

A83-16734# TOROIDAL FLOW COAL-FIRED MHD COMBUSTOR DESIGN STUDY AND TESTS

J. O. A. STANKEVICS, C. C. STEWART, and A. C. J. MATSSON (Avco Everett Research Laboratory, Inc., Everett, MA) American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 21st, Reno, NV, Jan. 10-13, 1983, 13 p. refs (Contract DE-AC22-78ET-10787) (AIAA PAPER 83-0467)

The design, fabrication, and testing of a prototype 20-MW (thermal) coal-fired combustor are described. The combustor design concept is based on a single-stage toroidal-flow clagging configuration that makes possible the achievement of a high overall thermal efficiency and the rejection of ash and slag particles. The vertical combustor has a cylindrical chamber, a downward flow, and a horizontal exit nozzle for directing the seeded combustion plasma to an MHD generator channel. Experiments conducted at operating pressures of up to 6 atm indicate a plasma temperature of 2650 to 2800 K, a gas conductivity of 6 to 7 mho/m, a carbon combustion efficiency of more than 99.5% and steady-state stable operation. F.G.M.

A83-16735*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

METHODS OF REDUCING ENERGY CONSUMPTION OF THE OXIDANT SUPPLY SYSTEM FOR MHD/STEAM POWER PLANTS

A. J. JUHASZ (NASA, Lewis Research Center, Cleveland, OH) American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 21st, Reno, NV, Jan. 10-13, 1983, 10 p. refs (AIAA PAPER 83-0468)

An in-depth study was conducted to identify possible improvements to the oxidant supply system for combined cycle MHD power plants which would lead to higher thermal efficiency and reduction in the cost of electricity, COE. Results showed that the oxidant system energy consumption could be minimized when the process was designed to deliver a product O₂ concentration of 70 mole percent. The study also led to the development of a new air separation process, referred to as 'liquid pumping and internal compression'. MHD system performance calculations show that the new process would permit an increase in plant thermal efficiency of 0.6 percent while allowing more favorable tradeoffs between magnetic energy and oxidant system capacity requirements. (Author)

A83-17149
LIQUID PHASE THERMOCHEMICAL ENERGY CONVERSION SYSTEMS - AN APPLICATION OF DIELS-ALDER CHEMISTRY
T. G. LENZ, L. S. HEGEDUS, and J. D. VAUGHAN (Colorado State University, Fort Collins, CO) International Journal of Energy Research, vol. 6, Oct.-Dec. 1982, p. 357-365. refs (Contract DE-FG02-79ER-10543)

A method of thermochemical energy conversion, transport, and storage research involving moderate and low temperature liquid phase systems employing Diels-Alder cycloaddition chemistry is described. Proposed as a heat storage system for solar and industrial waste heat, the system involves the meeting, in a reactor, of energy-depleted and energy-rich fluids. The poor fluid gains energy and goes through a chemical, endothermic dissociative change. The use of Diels-Alder reactions provides completely reversible chemical reactions for this application. The heated fluid can be retransported for storage or implementation as a heat source. The return reaction, releasing the stored heat, can be done spontaneously or in the presence of a catalyst such as Lewis acids. Attention is recommended for the Wentworth-Chen temperature of 250-300 C to minimize the system thermal degradation. Research in the synthesis of diene and dienophile

candidate chemicals, into sealed tube and reaction kinetic techniques, and into NMR techniques for identifying further reaction candidates are discussed. M.S.K.

A83-17371# DETONATION DRIVEN INDUCTION GENERATORS WITH PARALLEL AND ANTIPARALLEL EXTERNAL AND INDUCED MAGNETIC FIELDS

H. E. WILHELM (U.S. Navy, Michelson Laboratory, China Lake, CA) Physics of Fluids, vol. 25, Dec. 1982, p. 2401-2407. Navy-supported research. refs

Closed form solutions to initial value-problems for two types of detonation-driven induction generators are obtained with the use of Maxwell's equations. The plasma shock flows considered include an idealized jet flow featuring a constant shock speed and a plane detonation flow due to an explosive energy release. Electric current and voltage pulses induced in the generators, which have a magnetic Reynolds number much greater than one and are equipped with plane electrodes and a homogeneous external magnetic field, are calculated. The generator is regarded as having an external load circuit with a resistance and inductance connected to the downstream ends or the flow entrance ends of the electrodes, producing a magnetic self-field which is either parallel or antiparallel to the transverse external field, respectively. The generator with a positive superposition of the self-field and the transverse external field is determined to generate significantly greater power than one with a negative superposition. The jet flow also produced larger current and voltage pulses. M.S.K.

A83-17928# TECHNIQUES FOR THE SOLUTION OF MHD GENERATOR FLOWS

C. C. P. PIAN and A. W. MCCLAIN (Avco Everett Research Laboratory, Inc., Everett, MA) American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 21st, Reno, NV, Jan. 10-13, 1983, 14 p. refs (Contract DE-AC01-80ET-15614) (AIAA PAPER 83-0465)

A procedure is presented which employs an iterative shooting approach to solve the MHD equations and their appropriate boundary conditions under the quasi-one-dimensional approximation. The different kinds of boundary conditions that must be fulfilled for the various flow situations are summarized, and design and operational constraints imposed on the analysis are reviewed. Several examples are presented to illustrate the solution procedure and to demonstrate the various considerations in the design selection process. V.L.

A83-18457 THE DYNAMIC INDUCER AS A COST-EFFECTIVE WIND TURBINE SYSTEM

G. GYATT and A. ZALAY (AeroVironment, Inc., Pasadena, CA) In: Heat Transfer and Fluid Mechanics Institute, Meeting, 28th, Sacramento, CA, June 28, 29, 1982, Proceedings. Sacramento, CA, CSUS University Publications, 1982, p. 165-177. refs (Contract EG-77-C-06-1021; DE-AC02-77CH-00178; XE-1-1167-1)

The efficacy of dynamic inducer tip vanes, short airfoil sections attached perpendicularly at the outer end of wind turbine rotors, were investigated analytically and experimentally. The airfoil section is oriented to lift toward the center of the rotor, thereby forcing a greater flow toward the center of the actuator disk. Also, since the vortex shed by one tip vane posterior edge is exactly opposite in sign to the vortex produced at the anterior edge of the immediately preceding vane, a synchronous state arises wherein drag on the tip vanes is eliminated. A numerical model was developed for the wind turbine power coefficient in a synchronous state. The simulation indicated that more kinetic energy than present in the actuator disk alone can be captured. Design features of the blades and fairing are described. Dynamic inducer WECS were projected to cost 20% less than equivalent conventional horizontal axis machines, while power augmentation can approach 70%, thus exceeding the Betz limit. D.H.K.

A83-18494#

RESEARCH ON OXIDATION BY AIR AND TEMPERING OF RANEY NICKEL ELECTROCATALYSTS FOR THE H₂ ANODES OF ALKALI COMBUSTION MATERIALS CELLS [UNTERSUCHUNGEN ZUR LUFTOXIDATION UND TEMPERUNG VON RANEY-NICKEL-ELEKTROKATALYSATOREN FUER DIE H₂-ANODEN VON ALKALISCHEN BRENNSTOFFZELLEN]

H.-J. SELBACH Braunschweig, Technische Universitaet, Naturwissenschaftliche Fakultae, Doktor der Naturwissenschaften Dissertation, 1982. 152 p. In German. refs

The controlled oxidation in air of Raney-nickel electrocatalysts was studied, with special attention paid to the quantitative analysis of nickel hydroxide. The content of the latter was determined through X-ray studies, thermogravimetric measurements, and spectral-photometric examinations. The dependence of the content on the drying of activated catalyst is determined. The influence of nickel hydroxide on the electrochemical parameters of the catalyst, such as diffusion polarization, is studied, including a measurement of the exchange current density using the potential drop method. Conservation by oxidation in air with ancillary stabilization of the oxide in an H₂ flow at 300 C is explored, including reduction by H₂, the influence of tempering time, and structural studies on conserved and stabilized catalyst. Long-term research on the catalyst, including the influence of aging on the reduced catalyst, and the results of impedance measurements are presented.

C.D.

A83-18939

A REVIEW OF AERO-GENERATOR FATIGUE PROBLEMS

A. J. PRETLOVE (Reading, University, Reading, England) and P. J. WORTHINGTON (Central Electricity Generating Board, Materials Div., Leatherhead, Surrey, England) International Journal of Fatigue, vol 5, Jan. 1983, p. 15-22. refs

A review is presented of the problems of fatigue in the design of aero-generators, high technology windmills designed to generate electricity. The sources of fatigue loading for both horizontal-axis and vertical-axis machines are examined, and the effects of scaling-up from smaller to larger machines are evaluated. The fatigue performance of candidate materials for aero-generator designs, such as steels, aluminum alloys, glass-fiber composites, wood, and concrete, is discussed. Methods of fatigue assessment for aero-generator components are evaluated, including programmed loading tests and semi-empirical predictions based on known material properties.

N.B.

A83-19609

A METHOD FOR ANALYZING THERMIONIC-CONVERTER BATTERIES [METOD RASCHETA BATAREI TERMOEMISSIONNYKH PREOBRAZOVATELEI]

M. A. MENDELBAUM, A. P. SAVINOV, and V. V. SINIAVSKII Akademiia Nauk SSSR, Izvestiia, Energetika i Transport, Nov.-Dec. 1982, p. 140-147. In Russian. refs

A numerical method involving the consecutive solution of equations describing thermal and electric processes is proposed for calculating the characteristics of thermionic-converter batteries with series-parallel elements. The computational algorithm is implemented in the form of a computer program, and its efficiency is demonstrated by calculating the characteristics of a specific thermionic-converter battery. Changes in the thermal and electrical characteristics of the battery resulting from the variability of the thermal power and electric load or caused by a discontinuity in the internal electric circuit are examined.

V.L.

N83-10134*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

PORE SIZE ENGINEERING APPLIED TO STARVED ELECTROCHEMICAL CELLS AND BATTERIES

K. M. ABBEY and L. H. THALLER 1982 16 p refs Presented at the 17th Intersoc. Energy Conversion Eng. Conf., Los Angeles 8-13 Aug. 1982; sponsored by IEEE

(NASA-TM-82893; E-1271; NAS 1.15:82893) Avail: NTIS HC A02/MF A01 CSCL 10C

To maximize performance in starved, multiplate cells, the cell design should rely on techniques which widen the volume tolerance characteristics. These involve engineering capillary pressure differences between the components of an electrochemical cell and using these forces to promote redistribution of electrolyte to the desired optimum values. This can be implemented in practice by prescribing pore size distributions for porous back-up plates, reservoirs, and electrodes. In addition, electrolyte volume management can be controlled by incorporating different pore size distributions into the separator. In a nickel/hydrogen cell, the separator must contain pores similar in size to the small pores of both the nickel and hydrogen electrodes in order to maintain an optimum conductive path for the electrolyte. The pore size distributions of all components should overlap in such a way as to prevent drying of the separator and/or flooding of the hydrogen electrode.

Author

N83-10135*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

POLYVINYL ALCOHOL MEMBRANES AS ALKALINE BATTERY SEPARATORS

D. W. SHEIBLEY, O. GONZALEZ-SANABRIA, and M. MANZO 1982 23 p refs Presented at the Symp. of Membranes and Ionic and Electron. Conducting Polymers, Cleveland, 17-19 May 1982; sponsored by the Electrochemical Society

(NASA-TM-82961; E-1378; NAS 1.15:82961) Avail: NTIS HC A02/MF A01 CSCL 10C

Polyvinyl alcohol (PVA) cross-linked with aldehyde reagents yields membranes that demonstrate properties that make them suitable for use as alkaline battery separators. Film properties can be controlled by the choice of cross-linker, cross-link density and the method of cross-linking. Three methods of cross-linking and their effects on film properties are discussed. Film properties can also be modified by using a copolymer of vinyl alcohol and acrylic acid as the base for the separator and cross-linking it similarly to the PVA. Fillers can be incorporated into the films to further modify film properties. Results of separator screening tests and cell tests for several variations of PBA films are discussed.

Author

N83-10159# Bureau of Mines, Albany, Oreg. ELECTROCHEMICAL DETERMINATION OF GIBBS ENERGIES OF FORMATION OF COBALT AND NICKEL SULFIDES

S. C. SCHAEFER Jan. 1982 25 p refs (PB82-177304; BM-R1-8588) Avail: NTIS HC A02/MF A01 CSCL 07D

The standard Gibbs energies of cobalt sulfide and nickel sulfide were determined with high temperature galvanic cells using stabilized zirconia as the electrolyte.

GRA

N83-10348*# AiResearch Mfg. Co., Torrance, Calif.

A LIGHTWEIGHT ELECTRONICALLY COMMUTATED DC MOTOR FOR ELECTRIC PASSENGER VEHICLES Final Report

E. F. ECHOLDS and P. S. WALLA 1 Sep. 1982 96 p refs (Contract DEN3-64; DE-A101-77CS-51044)

(NASA-CR-165601; NAS 1.26:165601; AMC-81-18266) Avail: NTIS HC A05/MF A01 CSCL 09A

A functional model breadboard converter and a rare-earth-cobalt, permanent magnet motor, as well as an engineering model converter and PM motor suitable for vehicle installations were developed and tested. The converter and motor achieved an 88% peak efficiency, a maximum output of 26 kW at 26,000 rpm, and a continuous rating of 15 kW. The system also generated power to the source during braking, with a demonstrated

05 ENERGY CONVERSION

peak power available at the converter terminals of approximately 26 kW at 88% efficiency. Major conclusions include: (1) the SAE J227a(D) driving cycle efficiency for the converter/motor is 86% to 88% when energy available for recovery at the converter terminals is included; (2) the converter initial cost is approximately five times that of the permanent magnet motor, but can be reduced by means of LSI logic and integrated liquid cooled semiconductor packages; and (3) an electronically commutated motor with a liquid cooled converter will operate reliably without service or maintenance for the life of a passenger vehicle. A R H.

N83-10349*# General Electric Co., Schenectady, N. Y. Power Electronics Lab.

IMPROVED TRANSISTORIZED AC MOTOR CONTROLLER FOR BATTERY POWERED URBAN ELECTRIC PASSENGER VEHICLES Final Report

S. C. PEAK Sep. 1982 242 p refs

(Contract DEN3-59; DE-AI01-77CS-51044)

(NASA-CR-167978; DOE/NASA/0059-82/1; NAS 1.26:167978;

SRD-81-088) Avail: NTIS HC A11/MF A01 CSCL 09C

An ac motor controller for an induction motor electric vehicle drive system was designed, fabricated, tested, evaluated, and cost analyzed. A vehicle performance analysis was done to establish the vehicle tractive effort-speed requirements. These requirements were then converted into a set of ac motor and ac controller requirements. The power inverter is a three-phase bridge using power Darlington transistors. The induction motor was optimized for use with an inverter power source. The drive system has a constant torque output to base motor speed and a constant horsepower output to maximum speed. A gear shifting transmission is not required. The ac controller was scaled from the base 20 hp (41 hp peak) at 108 volts dc to an expanded horsepower and battery voltage range. Motor reversal was accomplished by electronic reversal of the inverter phase sequence. The ac controller can also be used as a boost chopper battery charger. The drive system was tested on a dynamometer and results are presented. The current-controlled pulse width modulation control scheme yielded improved motor current waveforms. The ac controller favors a higher system voltage. A.R.H.

N83-10366# Wisconsin Univ., Madison. Dept. of Physics.

PROTECTION OF LARGE CAPACITOR BANKS

J. C. SPROTT and T. W. LOVELL Jun. 1982 15 p

(Contract DE-AC02-76ET-53051)

(DE82-017353; DOE/ET-53051/41) Avail: NTIS HC A02/MF A01

Large capacitor banks, as used in many pulsed plasma experiments, are subject to catastrophic failure in the event of a short in the output or in an individual capacitor. Methods are described for protecting such banks to minimize the damage and down time caused by such a failure. DOE

N83-10369# Linde A.G., Hohlriegelskreuth (West Germany). Werksgruppe TVT.

REFRIGERATION SYSTEM OF SUPERCONDUCTING GENERATORS FOR LARGE POWER PLANTS Final Report, Apr. 1980

R. GLATTHAAR Bonn Bundesministerium fuer Forschung und Technologie Jun. 1982 105 p refs In GERMAN, ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-T-82-071; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 22

An electric generator with superconductor field windings with a capacity of 1000 to 2000 MVA was considered. No reliable equipment for refrigeration exists in order to adopt this technique in a power plant. The basic equipment, including the specifications of machines and apparatus, and a reliability study of such equipment able to function without maintenance more than 30,000 hours, were worked out. The selected cooling system consists of a compressor, a battery of heat exchangers, and a dewar liquid helium storage tank at a pressure of 1.2 bars and with a capacity of 5 m³. The liquid helium flows to the generator rotor and gaseous

helium with ambient conditions leaves the generator and is fed to the refrigerator for reliquification. A quantity of 5 g/sec of liquid helium is required for a generator with a capacity of 1000 MVA. The equipment and the exploitation method are described, e.g., starting of cooling the installation, starting of cooling dewar container, starting of cooling generator, stopping of installation, behavior under variable charge conditions, and short breakdown of cooling equipment. The construction and the testing of a helium cooling system is mentioned. Author (ESA)

N83-10496 State Univ. of New York, Buffalo.

EXTERNAL IONIZATION MECHANISMS FOR ADVANCED THERMIONIC CONVERTERS Ph.D. Thesis

M. E. HATZIPROKOPIOU 1981 116 p

Avail: Univ. Microfilms Order No. DA8204065

Ion generation and recombination mechanisms in the cesium plasma were investigated as they pertain to the advanced mode thermionic energy converters. The changes in plasma density and temperature within the converter were studied under the influence of several promising auxiliary ionization candidate sources. Three novel approaches of external cesium ion generation were investigated in some detail, namely vibrationally excited N₂ as an energy source of ionization of Cs ions in a DC discharge, microwave power as a means of resonant sustenance of the cesium plasma, and ion generation in a pulse N₂-Cs mixture. The experimental data obtained and discussed in this work show that all three techniques--i.e. the non-LTE high-voltage pulsing, the energy transfer from vibrationally excited diatomic gases, and the external pumping with a microwave power--have considerable promise as schemes in auxiliary ion generation applicable to the advanced thermionic energy converter. Dissert. Abstr.

N83-10502*# TRW, Inc., Redondo Beach, Calif

DEEP DISCHARGE RECONDITIONING AND SHORTED STORAGE OF BATTERIES Final Report

P. F. RITTERMAN May 1982 72 p refs

(Contract NAS3-21253)

(NASA-CR-167953; NAS 1.26:167953) Avail: NTIS HC A04/MF A01 CSCL 10C

The identification and measurement of hydrogen recombination in sealed nickel-cadmium cells makes deep reconditioning on a battery basis safe and feasible. Deep reconditioning improves performance and increases life of nickel-cadmium batteries in geosynchronous orbit applications. The hydrogen mechanism and supporting data are presented. Parameter cell design experiments are described which led to the definition of nickel-cadmium cells capable of high rate overdischarge without detriment to specific energy. Nickel-cadmium cells of identical optimum design were successfully cycled for 7 seasons in simulation of geosynchronous orbit at 75 percent depth-of-discharge with extensive midseason and end-of-season overdischarge at rates varying from C/20 to C/4. Destructive physical analysis and cyclin data indicated no deterioration or the development of dangerous pressures as a result of the cycling with overdischarge. Author

N83-10504*# Jet Propulsion Lab., California Inst of Tech., Pasadena

CORRELATION OF DESIGN WITH PERFORMANCE OF PRIMARY LITHIUM-SULFUR OXYHALIDE CELLS

H. A. FRANK 1 Jun. 1982 142 p refs

(Contract NAS7-100)

(NASA-CR-169369; JPL-PUB-82-30; NAS 1.26:169369) Avail: NTIS HC A07/MF A01 CSCL 10C

Results and assessments of a focused literature review of primary lithium sulfur oxyhalide cells are presented. Major emphasis is placed on the effect of component materials and designs on performance (energy density and rate capability), safety, and storage life of these cells. This information is a reference guide for the design of high energy batteries for future use on NASA missions. Author

N83-10561*# Joint Center for Graduate Study, Richland, Wash.
CONCEPTUAL DESIGN AND COST ANALYSIS OF HYDRAULIC OUTPUT UNIT FOR 15 KW FREE-PISTON STIRLING ENGINE Final Report

M. A. WHITE Aug. 1982 139 p refs Prepared in cooperation with Flow Industries Inc., Kent, Wash.

(Contract DEN3-212)

(NASA-CR-165543; DOE/NASA/0212-1, NAS 1.26-165543)

Avail: NTIS HC A07/MF A01 CSCL 10B

A long-life hydraulic converter with unique features was conceptually designed to interface with a specified 15 kW(e) free-piston Stirling engine in a solar thermal dish application. Hydraulic fluid at 34.5 MPa (5000 psi) is produced to drive a conventional hydraulic motor and rotary alternator. Efficiency of the low-maintenance converter design was calculated at 93.5% for a counterbalanced version and 97.0% without the counterbalance feature. If the converter were coupled to a Stirling engine with design parameters more typical of high-technology Stirling engines, counterbalanced converter efficiency could be increased to 99.6%. Dynamic computer simulation studies were conducted to evaluate performance and system sensitivities. Production costs of the complete Stirling hydraulic/electric power system were evaluated at \$6506 which compared with \$8746 for an alternative Stirling engine/linear alternator system Author

N83-10568*# Mechanical Technology, Inc., Latham, N. Y.
A CONCEPTUAL STUDY OF THE POTENTIAL FOR AUTOMOTIVE-DERIVED AND FREE-PISTON STIRLING ENGINES IN 30- TO 400-KILOWATT STATIONARY POWER APPLICATIONS Final Report

A. VATSKY, H. S. CHEN, and J. DINEEN May 1982 118 p refs

(Contract NAS3-21291)

(NASA-CR-165274; NAS 1.26:165274; MTI-82TR38) Avail:

NTIS HC A06/MF A01 CSCL 10B

The technical feasibility of applying automotive-derived kinematic and free-piston Stirling engine concepts for stationary applications was explored. Automotive-derived engines offer cost advantages by providing a mature and developed engine technology base with downrating and parts commonality options for specific applications. Two engine sizes (30 and 400 kW), two Stirling engine configurations (kinematic and free-piston), and two output systems (crankshaft and hydraulic pump) were studied. The study includes the influences of using either hydrogen or helium as the working gas. The first kinematic configuration selects an existing Stirling engine design from an automotive application and adapts it to stationary requirements. A 50,000-hour life requirement was established by downrating the engine to 40 kW and reducing auxiliary loads. Efficiency improvements were gained by selective material and geometric variations and peak brake efficiency of 36.8 percent using helium gas was achieved. The second design was a four-cylinder, 400 kW engine, utilizing a new output drive system known as the z-crank, which provides lower friction losses and variable stroke power control. Three different material and working gas combinations were considered. Brake efficiency levels varied from 40.5 percent to 45.6 percent. A 37.5 kW single-cycle, free-piston hydraulic output design was generated by scaling one cylinder of the original automotive engine and mating it to a counterbalanced reciprocal hydraulic pump. Metallic diaphragms were utilized to transmit power. Author

N83-10569# Raytheon Co., Bedford, Mass Missile Systems Div.

POWER CONDITIONING SUBSYSTEM DESIGN Interim Report, 17 Sep. 1979 - 30 Nov. 1981

J. J. MORIARTY, A. M. HERLING, J. J. KELLEHER, and D. W. SHUTE Wright-Patterson AFB, Ohio AFWAL Jan. 1982 112 p

(Contract F33615-79-C-2079; AF PROJ. 3145)

(AD-A117736; AFWAL-TR-82-2005; BR-13058) Avail: NTIS HC A06/MF A01 CSCL 10B

This interim report describes the results of the first two phases of a three phase program to provide designs of lightweight, low

volume power conditioning subsystems in the range of 500 kilowatts (kW) to 30 megawatts (MW) as part of the Air Force exploratory development program in high power airborne electrical power supply technology. These designs are based on presently available component technology such as solid state switching devices, newly developed thyratons and high energy density capacitors. Although these subsystems are to be operated in a burst mode, active cooling concepts have been utilized wherever they would result in an advantage in weight or volume. GRA

N83-10601# Grumman Aerospace Corp., Bethpage, N.Y.
INVESTIGATIONS OF THE TORNADO WIND ENERGY SYSTEM

J. T. YEN Golden, Colo. Midwest Research Inst. Jun. 1982

146 p refs Prepared for Midwest Research Inst., Golden, Colo. (Contract EG-77-C-01-4042; DE-AC02-77CH-00178;

E(49-18)-2555)

(DE82-017122; SERI/TR-11052-1) Avail: NTIS HC A07/MF A01

Current test results are presented on the Tornado Wind Energy System (TWES). The performance and potential of TWES systems using wind tunnel models are discussed. Experimental results on system performance with a simple bladed turbine in both the Grumman Research Tunnel and Langley V/STOL Tunnel are presented, followed by descriptions of a larger, 15-ft model and data from tests of a 30-in turbine, as well as results from a cost analysis. It is concluded that TWES has a good commercial potential. DOE

N83-10602# Secord (Nelson W.), Brighton, Mich.

WECS-LOAD CONTROLLED PITCH-VARIABLE LOAD CONVERSION TO HEAT

N. W. SECORD 29 Mar 1982 6 p

(Contract DE-FG02-81R-510309)

(DE82-014683; DOE/R5-10309/1) Avail: NTIS HC A02/MF A01

Installing a 4 kW windmill and instrumentation on a 100-ft. free-standing lattice tower, developing load control circuitry that will store excess energy in a 1000-gallon electrically heated water tank which will also provides domestic heat via a heat exchanger, and developing a torque controlled pitching hub and blade system are described. Project status and costs are discussed. DOE

N83-10603# Sandia Labs., Albuquerque, N. Mex. Applied Mechanics Div.

AEROELASTIC STABILITY ANALYSIS OF A DARRIEUS WIND TURBINE

D. POPELKA Feb. 1982 37 p refs

(Contract DE-AC04-76DP-00789)

(DE82-017001; SAND-82-0672) Avail: NTIS HC A03/MF A01

An aeroelastic stability analysis was developed for predicting flutter instabilities on vertical axis wind turbines. The analytical model and mathematical formulation of the problem are described as well as the physical mechanism that creates flutter in Darrieus turbines. Theoretical results are compared with measured experimental data from flutter tests of the Sandia 2 Meter turbine. Based on this comparison, the analysis appears to be an adequate design evaluation tool. DOE

N83-10604# Tetra Tech, Inc., Pasadena, Calif.

TECHNICAL AND ECONOMICAL ASSESSMENT ON TETHERED WIND-ENERGY SYSTEMS (TWES)

O. FURUYA and S. MAEKAWA Jun. 1982 88 p refs

(Contract DE-AC02-77CH-00178; EG-77-C-01-4042)

(DE82-017120; SERI/TR-09172-2) Avail: NTIS HC A05/MF A01

The potential of tethered wind energy systems for energy conversion in the upper atmosphere was investigated. The vertical takeoff and landing lift generation concept had the highest potential as compared to balloon, wind and hybrid concepts. DOE

05 ENERGY CONVERSION

N83-10624# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany). Fachbereich Mechanik.

DEVELOPMENT OF A 5.5 M DIAMETER VERTICAL AXIS WIND TURBINE, PHASE 3 Final Report, Jun, 1982

A. DEKITSCH, C. C. ETZLER, A. FRITZSCHE, G. LORCH, W. MUELLER, K. ROGALLA, J. SCHMELZLE, W. SCHUHWERK, A. VOLLAN, and D. WELTE Bonn Bundesministerium fuer Forschung und Technologie Jun. 1982 52 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-T-82-086; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 11

In continuation of development of a 5.5 m diameter vertical axis windmill that consists in conception, building, and wind tunnel testing, a Darrieus rotor windpowered generator feeding an isolated network under different wind velocity conditions and with optimal energy conversion efficiency was designed built, and field tested. The three-bladed Darrieus rotor tested in the wind tunnel was equipped with two variable pitch Savonius rotors 2 m in diameter. By means of separate measures of the aerodynamic factors and the energy consumption, effect of revisions and optimizations on different elements was assessed. Pitch adjustment of the Savonius blades, lubrication of speed reducer, rotor speed at cut-in of generator field excitation, time constant of field excitation, stability conditions, switch points of ohmic resistors which combined with a small electric battery simulated a larger isolated network connected with a large storage battery, were investigated. Fundamentals for the economic series production of windpowered generators with Darrieus rotors for the control and the electric conversion system are presented. Author (ESA)

N83-10633# Fachhochschule, Giessen (West Germany). Labor fuer Elektrische Messtechnik.

MEASUREMENT STUDIES OF A 15 KW WIND POWER PLANT Final Report, Sep. 1981

U. MACHENS Bonn Bundesministerium fuer Forschung und Technologie Jul. 1982 150 p refs In GERMAN, ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-T-82-109; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 31,50

The process in which the wind situation and the corresponding power data of the plant are recorded from instantaneous measurements is presented. This process was applied to the study of a small wind power plant, having a propeller diameter of 15 m and a power output of 15 kW at a wind speed of 9 meters/sec. The plant assembled of standard parts feeds the power to an electricity network. The plant, the synchronizing and switching of the network, the measuring procedure and the measuring equipment are described. The results of the measurements are stated and discussed. It is shown that the plant is capable of producing the expected power output. The possibilities of increasing the power output and simplifying the synchronizing and switching of the network are also indicated. Author (ESA)

N83-10634# National Hydroelectric Power Corp. Ltd., New Delhi (India).

SEMINAR ON ACCELERATED HYDROELECTRIC DEVELOPMENT IN INDIA: PROCEEDINGS, VOLUME 1

Mar. 1981 359 p refs Conf. held in New Delhi, 5-6 Mar 1981 Sponsored by Central Board of Irrigation and Power 2 Vol. (PB82-217753; CBIP-PUBL-150-VOL-1) Avail: NTIS HC A16/MF A01 CSCL 10B

Hydroelectric projects concentrating on adequacy, modernization, and acceleration are discussed. Planning and modern techniques of construction are also discussed. Contracts and coordination with power house equipment suppliers and contractors and data and technical information on hydroelectric development at high altitudes are presented. GRA

N83-10635# National Hydroelectric Power Corp. Ltd., New Delhi (India)

SEMINAR ON ACCELERATED HYDROELECTRIC DEVELOPMENT IN INDIA: POST SESSION PROCEEDINGS, VOLUME 2

May 1981 191 p refs Conf held in New Delhi, 5-6 Mar. 1981 Sponsored by Central Board of Irrigation and Power 2 Vol. (PB82-217761; CBIP-PUBL-150-VOL-2) Avail: NTIS HC A09/MF A01 CSCL 10B

Hydroelectric projects are investigated. Construction including concrete linings for tunnels and the use of laser systems in tunnelling, and powerhouse equipment suppliers and contractors are discussed. GRA

N83-10637# United Technologies Corp., South Windsor, Conn. **ON THE 40KW TEST POWER PLANT MODIFICATION AND DEVELOPMENT, PHASE 2 Annual Report**

R. FALCINELLI Chicago, Ill Gas Research Inst. Jun. 1981 96 p Sponsored by Gas Research Inst (Contract DE-AC03-77ET-11302) (PB82-216102; GRI-77/0015, FCR-2585) Avail: NTIS HC A05/MF A01 CSCL 10B

Verification testing of an improved 40 kW onsite phosphoric acid fuel cell power plant is discussed. Results showed the power plant to operate satisfactorily within the specification examined. However, additional verification testing is required. M.G

N83-10639# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.

OCEAN THERMAL ENERGY AT THE JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY Quarterly Report, Oct. - Dec. 1981

Jan. 1982 32 p refs (Contract DE-AI01-82ET-20342) (PB82-215054; OQR/81-4) Avail: NTIS HC A03/MF A01 CSCL 10A

The Johns Hopkins University Applied Physics Laboratory, under a contract with the U. S. Department of Energy's Division of Ocean Energy Technology (DOE/DOET), is engaged in developing Ocean Thermal Energy Conversion (OTEC) systems that will provide synthetic fuels (e.g., methanol), energy-intensive products such as ammonia (for fertilizers and chemicals), and aluminum. The work also includes assessment and design concepts for hybrid plants, such as geothermal-OTEC (GEOTEC) plants. APL has been designated the Lead Laboratory in these areas by DOE/DOET. This Quarterly Report summarizes the work on the various tasks as of 31 December 1981. GRA

N83-10879# California Univ., Livermore. Lawrence Livermore Lab

STABILITY AND DISTURBANCE OF LARGE DC SUPERCONDUCTING MAGNETS

S. T. WANG 1981 15 p refs Submitted for publication (Contract W-7405-ENG-48) (DE82-012388; UCRL-86890-REV-1) Avail: NTIS HC A02/MF A01

The stability aspects of several successful dc superconducting magnets are addressed. The 12 foot bubble chamber magnets, the 15 foot bubble chamber magnets, the MFTF-B magnet systems, the U-25B bypass MHD magnet, and the CFF Superconducting MHD magnet are examined. All of these magnets are cooled in pool boiling mode. Magnet design is reviewed and the adopted stability criteria, analyses of stability and disturbance, stability simulation, and the final results of magnet performance and the observed coil disturbances are discussed. DOE

N83-10880# Cornell Univ., Ithaca, N. Y. Dept. of Theoretical and Applied Mechanics.

MAGNETOELASTIC INSTABILITIES AND VIBRATIONS OF SUPERCONDUCTING-MAGNET SYSTEMS Final Summary Report, Sep. 1975 - May 1979

F. C. MOON Mar. 1982 40 p refs
(Contract DE-AS02-76ET-52042; DE-AC02-76ET-52042;
EY-76-S-02-2780; NSF ENG-76-23527)
(DE82-015206; DOE/ET-52042/5; COO-2780/5) Avail: NTIS
HC A03/MF A01

The structural design of superconducting magnets for magnetic fusion reactors was studied. Magnetomechanical instabilities in toroidal and poloidal field magnets for proposed fusion reactors were investigated. One major accomplishment was the building and testing of a 1/75th scale superconducting structural model of a 16 coil Tokamak reactor. The buckling of toroidal and poloidal field coils under different constraints was observed. The effect of currents on natural frequencies, poloidal-toroidal coil interaction, and buckling induced superconducting normal quench of the coils were studied. The stability of poloidal coil in a toroidal magnet field were investigated with the 16 coil torus. A superconducting poloidal coil becomes statistically unstable or buckle as the current approaches a certain value. Magnetoelastic buckling of other magnet systems such as a yin-yang pair of magnets, toroidal coils, and discrete coil solenoids are also studied. DOE

N83-10897# Department of Energy, Washington, D. C. Office of Energy Research.

TECHNOLOGY SPIN-OFFS FROM THE MAGNETIC FUSION ENERGY PROGRAM

May 1982 167 p
(DE82-016923; DOE/ER-0132) Avail: NTIS HC A08/MF A01

A description of 138 possible spin offs from the magnetic fusion program is presented. The spin offs cover the following areas: (1) superconducting magnets, (2) materials technology, (3) vacuum systems, (4) high frequency and high power rf, (5) electronics, (6) plasma diagnostics, (7) computers, and (8) particle beams. DOE

N83-10908# General Atomic Co., San Diego, Calif
THE DOUBLET III THOMSON-SCATTERING-SYSTEM HEMICONCENTRIC TRIPLET LENS

D. VASLOW Dec. 1981 35 p refs
(Contract DE-AT03-76ET-51011; GEN. ATOMIC PROJ 3344)
(DE82-017384; GA-A-16738) Avail: NTIS HC A03/MF A01

The D-III Thomson Profile System Hemiconcentric Triplet lens is described. This objective lens is used to image a 120 cm long segment of a focused TEM00 ruby laser beam onto a curved image plane where the light is collected by fiber optic bundles. The small ports on the D-III Tokamak make it necessary to situate the objective lens aperture near the front of the lens, and to funnel the light through the narrow port opening. The hemiconcentric triplet lens aperture is located at its front surface and the refraction at this surface acts to funnel the light resulting in excellent light collection at the expense of reduced off axis resolution due to astigmatism. At the edge of the field of view the worst case resolution along the laser beam is about 3 cm. The excellent correction of spherical and chromatic aberrations of this lens, however, result in minimal additional width of the light collection fiber optic bundles transverse to the beam image. DOE

N83-10910 Columbia Univ., New York.
PRODUCTION AND EXPERIMENTAL STUDY OF THE DISSIPATIVE TRAPPED ION INSTABILITY Ph.D. Thesis
J. T. SLOUGH 1981 167 p

Avail: Univ. Microfilms Order No. DA8204541

A steady-linear mirror machine was constructed to simulate the collisionality regime of a magnetically confined thermonuclear plasma. The collisionality regime was attained where the detrapping collision frequency from local magnetic mirrors was much less than either the electron or ion bounce frequency in the mirror. This is also the regime where the dissipative trapped ion instability (DTII) mode is predicted to be unstable. The low collisionality was

accomplished with a hydrogen plasma generated by an E II B discharge source. The mode was observed whenever the magnetic mirror was activated. The mode had the correct frequency and frequency dependence on both the magnetic field and the trapped fraction of plasma. The relative amplitude squared of the fluctuations, which were as large as 25% at low collisionality, had the same dependence on collisionality as the growth rate. The $m = 1$ mode which propagated azimuthally in the electron diamagnetic drift direction, was centered at the point of maximum radial density gradient and was confined axially to the magnetic mirror. The DTII mode exhibited all the basic features predicted by the basic dispersion relation derived for the linear geometry of the experiment, which, as is also shown, has great similarity to the results derived for toroidal geometries. Dissert. Abstr.

N83-10917# Nagoya Univ. (Japan) Inst. of Plasma Physics.
SAUSAGE INSTABILITY OF Z-DISCHARGED PLASMA CHANNEL IN LIB-FUSION DEVICE

S. KAWATA and K. NIU Jul. 1982 20 p refs
(IPPJ-602) Avail: NTIS HC A02/MF A01

The feasibility of using current carrying plasma channels for transporting intense ion beams from diodes to a target in a light ion beam fusion device is addressed. Specifically, the growth rate of the most dangerous surface mode, that is, axisymmetric sausage instability is examined for the plasma channel. The growth rate is shown to be smaller than that of the plasma channel with no fluid motion in a sharp boundary. It is concluded that the stable plasma channel can be formed. M.G.

N83-10919# Nagoya Univ. (Japan) Inst. of Plasma Physics.
PLASMA EQUILIBRIUM AND FIELD DIFFUSION DURING CURRENT RISE PHASE OF STP-2 SCREW PINCH TOKAMAK

A. NAGATA Jun. 1982 35 p refs
(IPPJ-594) Avail: NTIS HC A03/MF A01

Plasma equilibrium and field diffusion during the current rise phase of the discharge was investigated in STP-2 screw pinch tokamak. The plasma with maximum poloidal beta value $\beta_{sub} p$ of 3.0 was obtained by compression and joule heating. However the maximum $\beta_{sub} p$ value without strong wall contacts was about 1.3. It was observed that force free current is formed in the periphery of the plasma and the penetration rate of the poloidal magnetic field is much faster than the penetration rate calculated from the classical resistivity. To understand the high beta plasma equilibrium and the mechanism of fast penetration rate observed in STP-2 plasmas, a numerical simulation was performed using a 2-D MHD pinch code TOPICS. It is demonstrated that the fast penetration rate can be explained by introducing the influx of neutral particles and the ion acoustic type anomalous resistivity. M.G.

N83-10920# Nagoya Univ. (Japan). Inst. of Plasma Physics
US-JAPAN JOINT INSTITUTE FOR FUSION THEORY WORKSHOP ON NONEQUILIBRIUM STATISTICAL PHYSICS PROBLEMS IN FUSION PLASMAS: STOCHASTICITY AND CHAOS

Apr. 1982 206 p refs Workshop held in Kyoto, Japan, 9-13 Nov. 1981
(IPPJ-587) Avail: NTIS HC A10/MF A01

Recent progress in the research for magnetic confinement of high temperature plasmas has revealed several important roles played by the intrinsic stochasticity of the dynamical system. Problems in the theory of magnetic confinement and heating of plasmas require deep understanding of the mathematical structures as well as the physical consequences of the intrinsic stochasticity and chaos. Remarkable progress has been made in the understanding of these problems in the various fields of nonequilibrium statistical physics, such as fluid turbulence, critical phenomena, chemical turbulence, optical bistable systems, etc. This progress was realized by the introduction of modern mathematical concepts, such as mappings, bifurcations, scaling analyses, etc. L.F.M.

05 ENERGY CONVERSION

N83-10921# Nagoya Univ. (Japan) Inst. of Plasma Physics. US-JAPAN WORKSHOP ON BURNING PLASMA PHYSICS AND ENGINEERING

Jul. 1982 328 p refs Workshop held in Nagoya, Japan,
10-13 Feb. 1982
(IPPJ-599) Avail. NTIS HC A15/MF A01

A burning plasma experiment to inlet tritium into a fusion device and to study burning plasma physics is discussed. Tokamak reactors are discussed. Radial transport of alpha particles, the effects of toroidal field ripple on superthermal particles, and magnetic surface compression heating in the heliotron device are discussed. R.J.F.

N83-10922# Nagoya Univ. (Japan). Inst. of Plasma Physics. US-JAPAN JOINT INSTITUTE FOR FUSION THEORY WORKSHOP ON EQUILIBRIUM, STABILITY AND TRANSPORT OF NONAXISYMMETRIC SYSTEMS

Apr. 1981 74 p refs Workshop held at Nagoya, Japan, 14-18 Dec. 1981
(IPPJ-577) Avail. NTIS HC A04/MF A01

Theoretical aspects of stellarator/torsatron/heliotron, bumpy torus and tandem mirror are discussed. Main topics are equilibrium, stability and related beta limits in each confinement system. New types of stellarator with helical magnetic axis were also presented. L.F.M.

N83-10925 California Inst. of Tech., Pasadena MEASUREMENTS OF MAGNETIC FIELD FLUCTUATIONS IN THE CALTECH RESEARCH TOKAMAK Ph.D. Thesis

M. A. HEDEMANN 1982 128 p
Avail. Univ. Microfilms Order No. DA8203355

An experimental investigation of magnetic field fluctuations in a research Tokamak plasma was performed. The fluctuations were measured with movable probes inserted directly into the plasma. Estimates of the fluctuating field strength, power spectra density, and correlation lengths were made by calculations on the raw data. The fluctuations were found to be of comparable strength for the radial and poloidal components, while the toroidal component was found to be at least a factor of 5 weaker in strength. The fluctuating field strength showed no apparent dependence on plasma current and safety factor at the edge, but increased with electron density during gas puffing and as the minor radius of measurement was decreased. The power spectral density indicated that the fluctuations could be divided into two frequency regions. The low frequency regions. The low frequency regions. The low frequency region ($f < 100$ kHz) was dominated by coherent MHD modes with correlation lengths on the order of the Tokamak size. The high frequency region appeared to be turbulent in nature with short correlation lengths in the poloidal direction, but longer correlation lengths in the radial direction. The results are compared with theories of fluctuation sources and the effects of fluctuations on anomalous electron thermal transport. Dissert. Abstr.

N83-10926 Princeton Univ., N. J. MEASUREMENTS OF FUSION REACTIONS FROM A TOKAMAK PLASMA Ph.D. Thesis

R. E. CHRIEN 1981 121 p
Avail. Univ. Microfilms Order No. DA820322

Tokamak fusion reaction diagnostics were extended to include measurements of d-t, d-p-3He, and d-d (proton branch) reactions. The confinement and slowing down of 1 MeV d-d tritons were studied by measuring d-t neutrons. The first charged fusion products to be detected in a Tokamak were the 3 MeV d-d and 14.7 MeV d-3He protons. Beam-target d-3He reactions were measured during deuterium beam injection to study the transport and vessel retention of helium. Large d-3He reaction rates were produced by ion cyclotron heating of a 3He minority in a deuterium plasma. Measurements of the reaction rate, energy spectrum, and decay time indicate that the reactions are produced by 200 - 400 keV 3He ions. Sawtooth and $m = 2$ oscillations in the proton emission were observed. Dissert. Abstr.

N83-10928# Oak Ridge National Lab., Tenn. Fusion Energy Div.

CURVILINEAR COORDINATES FOR MAGNETIC CONFINEMENT GEOMETRIES

S. P. HIRSHMAN Aug. 1982 25 p refs
(Contract W-7405-ENG-26)

(DE82-019733; ORNL/TM-8393) Avail. NTIS HC A02/MF A01

The basic properties of curvilinear coordinates are reviewed. Some applications to the description of three dimensional magnetic confinement geometries are cited. The notation used attempts to be consistent with the literature, and the relation to differential geometry is stressed. DOE

N83-10930# California Univ., Berkeley Lawrence Berkeley Lab

ACCELERATOR AND FUSION RESEARCH DIVISION

D. L. JUDD Jan. 1982 36 p refs

(Contract W-7405-ENG-48)

(DE82-012361; LBL-14038) Avail. NTIS HC A03/MF A01

Transverse and longitudinal phase volumes are evaluated and dilution factors defined. A simpler expression for the effect of third-order geometric aberrations is given. Constraints on the final quadrupole bore radius are discussed. Parameters of the example design are considered and analyzed. The available dilution factor allows a comparison between the present induction linac example design and the rf linac designs available in 1978. Phase-space limitation on attaining high power density for spot heating experiments is discussed. DOE

N83-10931# Occidental Research Corp., Irvine, Calif STUDY OF ION BEAM-INITIATED INERTIAL-CONFINEMENT FUSION Final Report, 1 Jan. - 31 Dec. 1981

D. CHANG and D. PHELPS Feb. 1982 92 p refs

(Contract DE-AC08-81DP-40138)

(DE82-013935; DOE/DP-40138/1) Avail. NTIS HC A05/MF A01

A fusion program which is based on a reactor concept in which geometrically focused and time compressed beams of cold light ions and neutralizing cold electrons from large area sources are ballistically propagated over several meters through a near vacuum to implode a pellet target is discussed. The approach combines the cost advantage of efficient moderate voltage pulsed power technology with the simplicity advantage of unguided ballistic propagation. In addition, the compactness, efficiency, focusability and energy range of the system makes the approach of great interest for supplementary heating of magnetically confined fusion plasmas. Beam target interaction, beam propagation and source accelerator design were analyzed. A one dimensional implosion and nuclear burn code indicates that significant yields can be obtained from simple targets with moderately energetic light ions. The short term objective is to demonstrate that the required degree of space time focusing can be achieved on a 200-500 keV electron neutralized ion (or plasma) beam from a simple prototype 100 sq cm low temperature zeolite source. DOE

N83-10932# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.

RADIAL EFFECTS IN HEATING AND THERMAL STABILITY OF A SUB-IGNITED TOKAMAK

V. FUCHS, M. M. SHOUCRI, G. THIBAudeau, L. HARTEN, and A. BERS Feb. 1982 86 p refs

(Contract DE-AC02-78ET-51013; NSF ENG-79-070947)

(DE82-009384; DOE/ET-51013/32; PFC/RR-82-6) Avail. NTIS HC A05/MF A01

The existence of thermally stable subignited equilibria of a Tokamak reactor, sustained in operation by a feedback controlled supplementary heating source, was demonstrated. The establishment of stability depends on a number of radially nonuniform, nonlinear processes whose effect is analyzed. One dimensional (radial) stability analyses of model transport equations, together with numerical results from a 1-D transport code, are used to study the heating of DT plasmas in the thermonuclear regime. It is found that plasma core supplementary heating is a

thermally more stable process than bulk heating. In the presence of impurity line radiation, however, core heated temperature profiles may collapse, contracting inward from the limiter, the result of an instability caused by the increasing nature of the radiative cooling rate, with decreasing temperature. Conditions are established for the realization of a subignited high-Q, toroidal reactor plasma with appreciable output power (approx. = 2000 MW thermal). DOE

N83-10933# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.

ANTENNA-PLASMA COUPLING THEORY FOR ICRF HEATING OF LARGE TOKAMAKS

A. RAM and A. BERS Mar. 1982 8 p refs Presented at the 3rd Joint Varenna-Grenoble Intern. Symp. on Heating in Toroidal Plasmas, Grenoble, France, 22-27 Mar. 1982 (Contract DE-AC02-78ET-51013) (DE82-013226; DOE/ET-51013/38, PFC/CP-82-2; CONF-820345-8) Avail: NTIS HC A02/MF A01

The coupling characteristics of antenna structure were studied by analyzing a model where a thin current sheet is placed between a fully conducting wall and a sheet of anisotropic conductivity representing the screen. The inhomogeneous plasma in the shadow of the limiter is assumed to extend from the screen on wards away from the antenna. The excitation of the fields inside the plasma are found by analyzing the radiation properties of this current sheet antenna. In all experiments to-date, the cross-sectional plasmas are relatively small so that the RF conductor is a half-loop around the plasma in the poloidal direction. For reactor size plasmas, this cannot be done and the antenna dimensions will be small compared to the plasma cross-sections DOE

N83-10934# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.

LOWER HYBRID RF CURRENT DRIVE AND ELECTRON-CYCLOTRON HEATING ON THE VERSATOR 2 TOKAMAK

S. C. LUCKHARDT, S. F. KNOWLTON, M. PORKOLAB, G. BEKEFI, P. I. BONOLI, K. I. CHEN, B. COPPI, R. C. ENGLADE, A. S. FISHER, K. E. HACKETT et al. Apr. 1982 21 p refs Presented at third Joint Varenna-Grenoble Symp. on Heating in Toroidal Plasmas, Grenoble, France, 22-27 Mar. 1982 Prepared in cooperation with NRL, Washington, D.C. (Contract DE-AC02-78ET-51013) (DE82-017127; DOE/ET-51013/40; PFC/CP-82-4; CONF-820345-14) Avail: NTIS HC A02/MF A01

Lower-hybrid current drive experiments (LHCD) have been carried out on the Versator 2 Tokamak in which RF injection for pulse lengths longer than the plasma L/R time generated large increases in the net toroidal current. Incremental increases, (RADICAL)/I, of more than 35% were obtained. These current rises are strongly dependent on the relative phasing between waveguides, (RADICAL) ϕ = -900. In typical cases, Thomson scattering measurements during RF drive show a decrease in the central electron temperature from 240 eV + or - 45 eV to 120 eV + or - 20 eV due to the spontaneous reduction in ohmic heating power during RF drive. DOE

N83-10935# Los Alamos Scientific Lab., N Mex. CTR Div. **BEHAVIOR OF A PLASMA IN A HIGH-DENSITY GAS-EMBEDDED Z-PINCH CONFIGURATION Thesis**

J. S. SHLACHTER May 1982 198 p refs (Contract W-7405-ENG-36) (DE82-017396; LA-9333-T) Avail: NTIS HC A09/MF A01

A high density Z pinch is analyzed by examining the steady state energy balance between ohmic heating and bremsstrahlung radiation losses for a plasma column in pressure equilibrium. The model is expanded to include the time-varying internal energy and results in a quasi-equilibrium prescription for the load current through a constant radius plasma channel. This set of current waveforms is useful in the design of experimental systems. The behavior of a plasma for physically realizable conditions is first examined by allowing adiabatic changes in the column radius A

more complete model is then developed by incorporating inertial effects into the momentum equation, and the resultant global MHD computational computer simulations. These comparisons demonstrate the advantages of the global MHD description over zero dimensional models DOE

N83-10937# Argonne National Lab., Ill.

DEMONSTRATION TOKAMAK POWER PLANT STUDY Interim Report

Mar. 1982 582 p refs (Contract W-31-109-ENG-38) (DE82-016182; ANL/FPP/TM-154) Avail: NTIS HC A25/MF A01

A Tokamak power plant was studied. This design manual covers the following areas: (1) steady-state current drive, (2) impurity control and exhaust, (3) first wall and blanket, and (4) configuration and maintenance. DOE

N83-10938# Argonne National Lab., Ill. Fusion Power Program.

WILDCAT: A CATALYZED D-D TOKAMAK REACTOR

K. EVANS, JR., C. C. BAKER, J. N. BROOKS, R. G. CLEMMER, D. A. EHST, H. HERMAN, J. JUNG, R. F. MATTAS, B. MISRA, and D. L. SMITH Nov. 1981 246 p refs (Contract W-31-109-ENG-38) (DE82-013712; ANL/FPP/TM-150) Avail: NTIS HC A11/MF A01

The WILDCAT is a conceptual design of a catalyzed D-D, Tokamak, commercial, fusion reactor. The WILDCAT utilizes the beneficial features of no tritium breeding, while not extrapolating unnecessarily from existing D-T designs. The reactor is larger and has higher magnetic fields and plasma pressures than typical D-T devices. It is more costly, but eliminates problems associated with tritium breeding and has tritium inventories and throughputs approximately two orders of magnitude less than typical D-T reactors. There are two versions, a steady state one with Alfvén wave current drive and a pulsed version. Comparison with D-T devices were made, and cost and safety analyses are included. All of the major reactor systems are worked out to a level of detail appropriate to a complete, conceptual design. DOE

N83-10939# Massachusetts Inst. of Tech., Cambridge. Dept. of Physics.

OBSERVATION OF THE PARAMETRIC DECAY INSTABILITY DURING ELECTRON CYCLOTRON RESONANCE HEATING ON THE VERSATOR 2 TOKAMAK

F. S. MCDERMOTT, G. BEKEFI, and M. PORKOLAB Mar. 1982 22 p refs (Contract DE-AC02-78ET-51013) (DE82-012573; DOE/ET-51013/37; PFC/RR-82-9) Avail: NTIS HC A02/MF A01

A nonlinear, three wave interaction process occurring during high power electron cyclotron heating in the Versator II Tokamak were observed. The measured spectra and the threshold power are consistent with a model in which the incident power in the extraordinary mode of polarization decays at the upper hybrid resonance layer into a lower hybrid wave and an electron Bernstein wave. DOE

N83-10940# Oak Ridge National Lab., Tenn. Fusion Energy Div.

RIPPLING MODES IN THE EDGE OF A TOKAMAK PLASMA

B. A. CARRERAS, J. D. CALLEN (Wisconsin Univ., Madison), P. W. GAFFNEY, and H. R. HICKS Feb. 1982 52 p refs (Contract W-7405-ENG-26) (DE82-007724; ORNL/TM-7989) Avail: NTIS HC A04/MF A01

A promising resistive magnetohydrodynamic candidate for the underlying cause of turbulence in the edge of a Tokamak plasma is the rippling instability. A computational model for these modes in the cylindrical Tokamak approximation was developed and the linear growth and single helicity quasilinear saturation phases of the rippling modes for parameters appropriate to the edge of a Tokamak plasma was explored. Large parallel heat conduction does not stabilize these mode. Nonlinearly, individual rippling modes

05 ENERGY CONVERSION

are found to saturate by quasilinear flattening of the resistivity profile. The saturated amplitude of the modes scales as m/sup -1/, and the radial extent of these modes grows linearly with time due to radial Vector $E \times$ Vector B_0 convection. It is found that this evolution is terminated by parallel heat conduction. DOE

N83-10941# Science Applications, Inc., Boulder, Colo. Plasma Research Inst.

INSTABILITIES DRIVEN BY THE PARALLEL VARIATION OF THE ELECTROSTATIC POTENTIAL IN TANDEMS

X. S. LEE, P. J. CATTO, and R. E. AAMODT May 1982 10 p refs

(Contract DE-AC03-76ET-53057)

(DE82-018409; SAI-254-82-134-LJ; PRI-42) Avail: NTIS HC A02/MF A01

It is demonstrated that the free energy associated with the sheared flow induced by the parallel variations of drift frequencies can provide a new destabilizing term. In particular, it is shown that a magnetohydrodynamic-like instability may occur in the mirror end plugs or thermal barrier region of a tandem mirror fusion device. DOE

N83-10942# Oak Ridge National Lab., Tenn. Fusion Energy Div.

RESISTIVE MHD STUDIES OF HIGH-BETA TOKAMAK PLASMAS

V. E. LYNCH, H. R. HICKS, J. A. HOLMES, B. A. CARRERAS, and L. GARCIA Feb. 1982 49 p refs Sponsored in part by the US-Spanish Joint Committee for Scientific and Technical Cooperation

(Contract W-7405-ENG-26)

(DE82-008101; ORNL/TM-8082) Avail: NTIS HC A03/MF A01

The magnetohydrodynamic (MHD) activity in high beta Tokamaks such as ISX-B was calculated. These initial value calculations are built on earlier low beta techniques, but the beta effects create several new numerical issues. In addition to time stepping modules, the system of computer codes includes equilibrium solvers (used to provide an initial condition) and output modules, such as a magnetic field line follower and an X-ray diagnostic code. The transition from current driven modes a low beta to predominantly pressure driven modes at high beta is described. The nonlinear studies yield X-ray emissivity plots which are compared with experiment. DOE

N83-10943# Oak Ridge National Lab., Tenn. Fusion Energy Div.

FUSION REACTOR PLASMA-PERFORMANCE MODELING: POPCON ANALYSIS

W. A. HOULBERG, S. E. ATTEMBERGER, and L. M. HIVELY Jun. 1982 42 p refs

(Contract W-7405-ENG-26)

(DE82-016364; ORNL/TM-8282) Avail: NTIS HC A03/MF A01

A method of analyzing plasma performance over large regions of density and temperature space with time-dependent multidimensional transport codes is presented. Contour plots of global plasma parameters are shown to be a valuable tool for determining the impact of very detailed physics on plasma performance. Tokamak reactor applications illustrate the importance of plasma geometry and profile effects on both steady-state and startup behavior. DOE

N83-10945# Los Alamos Scientific Lab., N. Mex.

PARAMETRIC SYSTEMS ANALYSIS OF THE MODULAR STELLARATOR REACTOR (MSR)

R. L. MILLER, R. A. KRAKOWSKI, and C. G. BATHKE May 1982 43 p refs

(Contract W-7405-ENG-36)

(DE82-016244; LA-9344-MS) Avail: NTIS HC A03/MF A01

The close coupling in the stellarator/torsatron/heliotron (S/T/H) between coil design, magnetics topology, and plasma performance complicates the reactor assessment more so than for most magnetic confinement systems. To provide an additional degree of resolution of this problem for the Modular Stellarator Reactor

(MSR), a parametric systems model was applied. This model reduces key issues associated with plasma performance, first wall/blanket/shield (FW/B/S), and coil design to a simple relationship between beta, system geometry, and a number of indicators of overall plant performance. The results are used to guide more detailed, multidimensional plasma, magnetics, and coil design efforts towards technically and economically viable operating regimes. It is shown that beta values 0.08 may be needed if the MSR approach is to be substantially competitive with other approaches to magnetic fusion in terms of system power density, mass utilization, and cost for total power output around 4.0 GWt; lower powers will require even higher betas. DOE

N83-10947# Rensselaer Polytechnic Inst., Troy, N. Y. Dept of Nuclear Engineering.

NEUTRON ATTENUATION IN THE LASER DUCTS OF AN INERTIAL-CONFINEMENT FUSION REACTOR

F. AUGUSTINE, JR. Nov. 1981 107 p refs

(Contract DE-AC02-77ET-51010)

(DE82-007195; WFPS-TME-81-031) Avail: NTIS HC A06/MF A01

Neutron streaming through the laser beam ducts of an inertial confinement fusion power plant is discussed. The neutron flux through these ducts must be attenuated by a factor of 10^{12} to meet radiological safety limits. Mirrors are used to bend the path of the laser beam while cutting off a line of sight path for neutrons. The Monte Carlo Code MCNP was used to analyze the two mirror SOLASE design, which only attenuated the neutron flux by a factor of 10^3 . The Westinghouse design, attenuated the neutron flux by 10^4 per mirror bend, and three mirror bends were needed. It is also revealed that the large length/diameter ratio of the ducts and the thinner mirror design are crucial to the large attenuation. It is suggested that a two mirror system can be developed, at 10^6 attenuation per mirror bend by utilizing point cross overs, a second flux trap, and acute column to column angles. DOE

N83-10949# Oak Ridge National Lab., Tenn. Fusion Energy Div.

SECOND-CYCLOTRON-HARMONIC MEASUREMENTS ON ISX-B

EMISSION

A. G. KULCHAR (Tennessee Univ.), J. B. WILGEN, A. C. ENGLAND, O. C. ELDRIDGE, C. M. LORING, G. BEKEFI (MIT), and K. E. HACKETT (MIT) Apr. 1982 33 p refs

(Contract W-7405-ENG-26)

(DE82-009938; ORNL/TM-8200) Avail: NTIS HC A03/MF A01

Second harmonic cyclotron radiation was used to measure the electron temperature during electron cyclotron heating (ECH) on the Impurity Study Experiment (ISX-B) tokamak. The 58-GHz and 70-GHz microwave superheterodyne receivers used for the measurements are described in detail. The limitations of the use of cyclotron radiation for a temperature measurement are quantified in terms of both the density and the temperature. A comparison is made between the results from the microwave diagnostics and those from the laser Thomson scattering to demonstrate that the cyclotron emission is thermal. A brief discussion of sensitivity to runaways and to other nonthermal populations is given. DOE

N83-10951# Georgia Inst. of Tech., Atlanta. School of Nuclear Engineering.

REVIEW OF PLASMA-IMPURITY SOURCES DURING TOKAMAK OPERATION

B. DEWALD Jan. 1982 51 p refs

(Contract DE-AS05-78ET-52025)

(DE82-017098; GTFR-30) Avail: NTIS HC A04/MF A01

A general review is given on the present status of understanding plasma impurity sources which occur during nondisruptive Tokamak operation. Included in the review are the processes of arcing, physical sputtering, neutron sputtering, desorption, chemical erosion, blistering, and backscattering. Excluded from the study are vaporization sources which are associated with the breakdown and initial startup phases of the plasma burn and major disruptions. The aspects of each impurity source which is discussed cover the theoretical and empirical models, the significant of the impurity

yield, and the relevance of the process in consideration of near term and future Tokamak plasma edge conditions. DOE

N83-10952# Columbia Univ., New York. School of Engineering and Applied Science.
OBSERVATIONS OF PLASMA ROTATION IN THE HIGH-BETA TOKAMAK TORUS 2
C. KOSTEK and T. C. MARSHALL 1982 30 p refs
(Contract DE-AC02-76ET-53016)
(DE82-019373; DOE/ET-53016/78) Avail: NTIS HC A03/MF A01

Toroidal and poloidal plasma rotation are measured in a high Beta Tokamak device by studying the Doppler shift of the 4686 Å He II line. The toroidal flow motion is in the same direction as the plasma current at an average velocity of 1.6×10^6 cm/sec, a small fraction of the ion thermal speed. The poloidal flow follows the ion diamagnetic direction, also at an average speed of 1.6×10^6 cm/sec. The toroidal flow is compared with the predictions of neoclassical transport theory in the collisional regime. Mechanisms for the time evolution of the rotation are also examined. E.A.K.

N83-10953# Oak Ridge National Lab., Tenn. Physics Div
FARADAY-ROTATION MEASUREMENTS IN ISX-B
D. P. HUTCHINSON, C. H. MA, P. A. STAATS, and K. L. VANDERSLUIS 1982 16 p refs
(Contract W-7405-ENG-26)
(DE82-011507; DOE/NBM-2011507) Avail: NTIS HC A02/MF A01

A submillimeter wave phase modulated polarimeter/interferometer is used for simultaneous time dependent measurement of line averaged electron density and poloidal field induced Faraday rotation along chords of the plasma column in ISX-B Tokamak. Heterodyne detection and hollow dielectric waveguide are utilized to achieve the high sensitivity required for the multichord experiment. A data analysis code is developed to reconstruct the asymmetric distributions of plasma density. The validity of the code is examined, and good agreement with density profiles measured by Thomson scattering are shown. DOE

N83-10957# Oak Ridge National Lab., Tenn. Fusion Energy Div.
NEUTRAL-BEAM DEPOSITION IN LARGE, FINITE-BETA NONCIRCULAR TOKAMAK PLASMAS
R. M. WIELAND and W. A. HOULBERG Feb. 1982 37 p refs
(Contract W-7405-ENG-26)
(DE82-008146; ORNL/TM-7658) Avail: NTIS HC A03/MF A01

A parametric pencil beam model which describes the attenuation of an energetic neutral beam moving through a Tokamak plasma is discussed. The nonnegligible effects of a finite beam cross section and noncircular shifted plasma cross sections are accounted for by using a smoothing algorithm dependent linearly on beam radius and by including information on the plasma flux surface geometry explicitly. The model is benchmarked against more complete and more time consuming two dimensional Monte Carlo calculations for the case of a large D-shaped Tokamak plasma with minor radius $a = 120$ cm and elongation $b/a = 1.6$. Deposition profiles are compared for deuterium beam energies of 120 to 150 keV, central plasma densities of 8×10^{13} - 2×10^{14} cm⁻³, and beam orientation ranging from perpendicular to tangential to the inside wall. DOE

N83-10958# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
METHODS TO ENHANCE BLANKET POWER DENSITY
P. Y. HSU, L. G. MILLER, T. S. BOHN, G. A. DEIS, G. R. LONGHURST, L. S. MASSON, D. E. WESSOL, and M. A. ABDOL (Argonne National Lab., Ill.) Jun. 1982 25 p refs
(Contract DE-AC07-76ID-01570)
(DE82-017467; EGG-FT-5885) Avail: NTIS HC A02/MF A01

The extent to which the power density in the FED/INTOR breeder blanket test modules can be enhanced by artificial means was investigated. It is assumed that a viable approach can be

developed which will allow advanced reactor blanket modules to be tested on FED/INTOR under representative conditions. DOE

N83-10991*# Mechanical Technology, Inc., Latham, N. Y.
AUTOMOTIVE STIRLING ENGINE MOD 1 DESIGN REVIEW, VOLUME 2 Final Report
Aug. 1982 573 p
(Contract DEN3-32; DE-AI01-77CS-51040)
(NASA-CR-167936; DOE/NASA/0032-17-VOL-2; NAS 1.26:167936; REPT-80ASE142DR1-VOL-2) Avail: NTIS HC A04/MF A01 CSCL 13F

The auxiliaries and the control system for the ASE MOD 1: (1) provide the required fuel and air flows for a well controlled combustion process, generating heat to the Stirling cycle; (2) provide a driver acceptable method for controlling the power output of the engine; (3) provide adequate lubrication and cooling water circulation; (4) generate the electric energy required for engine and vehicle operation; (5) provide a driver acceptable method for starting, stopping and monitoring the engine; and (6) provide a guard system, that protects the engine at component or system malfunction. The control principles and the way the different components and sub-systems interact are described as well as the different auxiliaries, the air fuel system, the power control systems and the electronics. The arrangement and location of auxiliaries and other major components are also examined. A.R.H.

N83-11063*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio
COLD-AIR PERFORMANCE OF COMPRESSOR-DRIVE TURBINE OF DEPARTMENT OF ENERGY UPGRADED AUTOMOBILE GAS TURBINE ENGINE. 2: STAGE PERFORMANCE
R. J. ROELKE and J. E. HAAS Oct. 1982 18 p refs Prepared in cooperation with Army Aviation Research and Development Command, Cleveland
(Contract EC-77-A-31-1011)
(NASA-TM-82818; DOE/NASA/1011-36, NAS 1 15:82818; AVRADCOM-TR-82-C-1) Avail: NTIS HC A02/MF A01 CSCL 10B

The aerodynamic performance of the compressor-drive turbine of the DOE upgraded gas turbine engine was determined in low temperature air. The as-received cast rotor blading had a significantly thicker profile than design and a fairly rough surface finish. Because of these blading imperfections a series of stage tests with modified rotors were made. These included the as-cast rotor, a reduced-roughness rotor, and a rotor with blades thinned to near design. Significant performance changes were measured. Tests were also made to determine the effect of Reynolds number on the turbine performance. Comparisons are made between this turbine and the compressor-drive turbine of the DOE baseline gas turbine engine. Author

N83-11397# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Electrical, Computer and Systems Engineering.
DIGITAL IMAGE TRANSMISSION AND CODING
J. W. MODESTINO (California Univ. at San Diego, La Jolla) /in AGARD Image Process. Tech. 8 p May 1982 refs
Avail: NTIS HC A11/MF A01

A survey is provided of digital processing techniques for the coding, transmission and remote reconstruction of imagery data. The coding techniques considered include PCM, DPCM, and its logical extension tree coding, as well as block transform techniques. Particular emphasis is given to the effects of channel errors on each of these techniques, as well as techniques for combatting these effects. Combined source channel coding approaches which have proven particularly effective in optimizing image reconstruction quality subject to a constraint on the overall transmission bandwidth are considered. Author

05 ENERGY CONVERSION

N83-11504# Milwaukee School of Engineering, Wis. Fluid Power Inst.

BREAK-IN, PERFORMANCE AND ENDURANCE TESTS RESULTS ON FIXED DISPLACEMENT HYDRAULIC FLUID POWER VANE PUMPS Final Report, Dec. 1980 - Jun. 1982

15 Jul. 1982 497 p

(Contract DAAK70-81-C-0002)

(AD-A117962; REPT-50423) Avail: NTIS HC A21/MF A01

CSCL 13K

This report summarizes the results obtained in evaluation 21 vane pumps from three different manufacturers on overall performance, accelerated life, 1000 hour endurance and thermal stability tests using clean oil. GRA

N83-11579*# Kaman Aerospace Corp., Bloomfield, Conn **DESIGN AND FABRICATION OF COMPOSITE BLADES FOR THE MOD-1 WIND TURBINE GENERATOR Final Report**

W. R. BATESOLE and C. T. GUNSALLUS Nov. 1981 106 p refs

(Contract DEN3-131; DE-AI01-76ET-2030)

(NASA-CR-167987; DOE/NASA/0131-1; NAS 1.26:167987;

RR-1685) Avail: NTIS HC A06/MF A01 CSCL 10B

The design, tooling, fabrication, quality control, and testing phases carried out to date, as well as testing still planned are described. Differences from the 150 foot blade which were introduced for cost and manufacturing improvement purposes are discussed as well as the lightning protection system installed in the blades. Actual costs and manhours expended for Blade No. 2 are provided as a base, along with a projection of costs for the blade in production. A.R.H.

N83-11590# Maschinenfabrik Augsburg-Nuernberg A.G., Augsburg (West Germany). Neue Technologie.

TEST PROGRAM FOR WIND ENERGY CONVERSION SYSTEM GROWIAN Final Report, Sep. 1981

F. KOERBER Bonn Bundesministerium fuer Forschung und Technologie Jun 1982 132 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-072; ISSN-0340-7608) Avail: NTIS HC A07/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 27,50

The planned test program for wind energy conversion is described. Measurements made of wind distribution, efficiency of energy conversion, dynamic effects, electric behavior, optimization of control, and environmental impact, like sound and TV interferences are discussed. Wind distribution is measured far enough in front of the windmill, just before the blades, and behind the rotor by a grid arrangement of anemometers covering entirely the rotor area in 25m steps. Measuring programs carried out on other windmills, location of measurement instruments, protection against lightning, and computation of data are reviewed. A proposal for measurement procedures and data processing is made.

Author (ESA)

N83-11601# AEG-Telefunken, Frankfurt am Main (West Germany). Inst. of Physical Chemistry.

CRUDE GAS/AIR FUEL CELLS WITH A PHOSPHORIC ACID MATRIX Final Report, Apr. 1981

R. FLEISCHMANN Bonn Bundesministerium fuer Forschung und Technologie Aug. 1982 48 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-167; DK-621.352.6.035.2; ISSN-0340-7608)

Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 10,10

Further development of the phosphoric acid matrix cell with tungsten carbide anodes was undertaken in order to increase the reliability of materials and production process, increase capacity, and reduce maintenance. This led to the long duration testing of single elements, the setting up of five cell elements, and multiple cell elements. Matrix development, fabrication of the active anode layers, fabrication of the cathode layers, fabrication of graphite

plates, assembly, and functioning of the cells were investigated. More than one hundred cell assemblies were built and tested between 1000 and 5000 hours of functioning. The multiple cell battenes prove to fail due to local overheating, uneven gas distribution, cracks in graphite plates, and obstruction of the hydrogen gas supply channels. The production technology of the matrix plates was optimized. The specific problem of the larger stacks is evaluated. Author (ESA)

N83-11603# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.

AERODYNAMIC RESEARCH ON TIPVANE WIND TURBINES

G. J. W. VANBRUSSEL, T. VANHOLTEN, and G. A. M. VANKUIK Apr. 1982 16 p refs

(VTH-LR-355) Avail: NTIS HC A02/MF A01

Aerodynamic loads on small auxiliary wings that are mounted at the tips of wind turbine blades in such a way that a diffuser effect is generated, resulting in a mass flow augmentation through the turbine disk, were analyzed. For load prediction, an expansion method, or lifting line approach, was used. The complete analytical expression for the pressure field consists of two series of basic pressure fields. One series is related to the basic load distributions over the turbine blade, and the other series to the basic load distribution over the tipvane. In addition, another basic pressure field, related to a triangular load distribution over the turbine blade and the tipvane, is needed in order to take care of the lift transfer from turbine blade to tipvane. The coefficients in these pressure field expressions are a priori unknown and are determined by a boundary condition, requiring the flow to be tangential on both turbine blade and tipvane. A numerical procedure then yields the coefficients of the basic pressure fields. Author (ESA)

N83-11607# Energy Research Corp., Danbury, Conn **INTERNAL REFORMING FOR NATURAL GAS FUELED MOLTEN CARBONATE FUEL CELLS Final Report, 1 May 1980 - 30 Jun. 1981**

B. BAKER, D. BURNS, C. LEE, H. MARU, and P. PATEL Dec. 1981 107 p Presented at the Natl. Fuel Cell Seminar, Norfolk, Va., Jun. 1981 and at the Intern. Gas Res. Conf., Los Angeles, Sep.-Oct. 1981 Sponsored by Gas Research Inst.

(PB82-200676, ERC-90-6194(13); GRI-80/0126) Avail: NTIS HC A06/MF A01 CSCL 10B

A natural gas fueled molten carbonate fuel cell (MCFC), a system which yields maximum efficiency while operating on internal reforming mode is discussed. Direct internal reforming appears to be a most promising configuration for internal reforming. Compared to the conventional baseline external reformer system, it can save as much as 20% natural gas at reduced capital and operating costs. Bench scale cells were operated with direct methane feed up to 2000 hours. It is shown that a successful development of the internal reforming MCFC will result in significant savings of natural gas and a cost effective electricity generation. GRA

N83-12088*# AiResearch Mfg. Co., Phoenix, Ariz.

ADVANCED GAS TURBINE (AGT) POWERTRAIN SYSTEM DEVELOPMENT PROGRAM Monthly Technical Progress Report, 1 Aug. - 31 Aug. 1980

R. A. RACKLEY 26 Sep. 1980 124 p

(Contract DEN3-167)

(NASA-CR-169475; NAS 1.26:169475; AMC-31-3480(11);

MTPR-11) Avail: NTIS HC A06/MF A01 CSCL 21E

Gas turbine automobile powertrain research is reported. The compressor, turbine, combustor, regenerator, gearbox, ceramic components/subsystems, bearings, and controls are discussed.

N.W.

N83-12327# Fraser (J. Kenneth) and Associates, Rensselaer, N.Y.

MODULAR SMALL HYDRO CONFIGURATION

Sep. 1981 195 p refs

(PB82-184953; ERDA-81-16; REPT-262/ET-RER/80) Avail: NTIS HC A09/MF A01 CSDL 17B

Smaller sites (those under 750 kilowatts) which previously were not attractive to develop using equipment intended for application at larger scale sites, were the focal point in the conception of a system which utilizes standard industrial components which are generally available within short procurement times. Such components were integrated into a development scheme for sites having 20 feet to 150 feet of head. The modular small hydro configuration maximizes the use of available components and minimizes modification of existing civil works. A key aspect of the development concept is the use of a vertical turbine multistage pump, used in the reverse mode as a hydraulic turbine. The configuration allows for automated operation and control of the hydroelectric facilities with sufficient flexibility for inclusion of potential hydroelectric sites into dispersed storage and generation (DSG) utility grid systems. GRA

N83-12431# Detroit Diesel Allison, Indianapolis, Ind.

ADVANCED GAS TURBINE (AGT) POWERTRAIN SYSTEM DEVELOPMENT FOR AUTOMOTIVE APPLICATIONS

Semiannual Report, 1 Oct. 1979 - 30 Jun. 1980

May 1981 285 p refs

(Contract DEN3-168)

(NASA-CR-165178; DOE/NASA/0168-80/1; NAS 1 26:165178, DDA-EDR-10327; SAR-1) Avail: NTIS HC A13/MF A01 CSDL 21E

Preliminary layouts were made for the exhaust system, air induction system, and battery installation. Points of interference were identified and resolved by altering either the vehicle or engine designs. An engine general arrangement evolved to meet the vehicle engine compartment constraints while minimizing the duct pressure losses and the heat rejection. A power transfer system (between gasifier and power turbines) was developed to maintain nearly constant temperatures throughout the entire range of engine operation. An advanced four speed automatic transmission was selected to be used with the engine. Performance calculations show improvements in component efficiencies and an increase in fuel economy. A single stage centrifugal compressor design was completed and released for procurement. Gasifier turbine, power turbine, combustor, generator, secondary systems, materials, controls, and transmission development are reported. Author

N83-12437# General Electric Co., Schenectady, N. Y.

DEVELOPMENT OF HIGH TEMPERATURE TURBINE SUBSYSTEM TECHNOLOGY TO A TECHNOLOGY READINESS STATUS, PHASE 2 Quarterly Report, Jul. - Sep. 1981

M. W. HORNER Oct. 1981 91 p refs

(Contract DE-AC01-76ET-10340)

(DE82-003222; DOE/ET-10340/119) Avail: NTIS HC A05/MF A01

A high temperature gas turbine for use in a combined cycle power plant, with coal derived fuel at a firing temperature of 26000 F and with growth capability to 30000 F was developed. Component design and technology testing in critical areas; and system design and tradeoff analyses in sufficient depth to support the component design and test tasks were performed; and the combined cycle plant studies to evaluate the commercial viability of a GE-TRV gas turbine system were updated. The turbine, combustor, hot gas cleanup system and other components were evaluated. DOE

N83-12439# R and D Associates, Marina Del Rey, Calif.

CONCEPT EVALUATION OF AUTOMOTIVE PROPULSION USING LIQUID AIR/NITROGEN, TASK 5 REPORT

J. L. DOOLEY and R. P. HAMMOND Jul. 1982 12 p refs

(Contract DE82-01968; RDA-TR-118700-004)

Avail: NTIS HC A02/MF A01

Two alternative programs for developing a vehicle to demonstrate the performance of an automotive propulsion system using liquid air or nitrogen in a Rankine cycle engine are described. Program A is a two-stage development in which the initial stage is an examination in depth of the most critical areas of concept components without undertaking confirmatory hardware testing and development. The second stage would continue the work with bench testing, complete component hardware development, and construction and testing of an instrumented roadable test vehicle and a demonstration vehicle. Program B is a coordinated, interactive analysis, design and development course that results in a driveable demonstration vehicle in the shortest time and at the lowest cost. It permits many low-cost bench tests to verify design early in the program. Operation of larger components can be done soon enough to get maximum feedback and interaction into the system design. The first two-stage program is justifiable and expedient in a period when adequate development funds are currently unavailable but may become available at a later date, while the alternative coordinated program is the more expeditious pathway to the goal of a successful demonstration of the concept. DOE

N83-12520# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

ANALYTICAL MODE FOR INTERIM EXPANSION OF ELECTRICAL ENERGY GENERATING SYSTEMS M.S. Thesis [MODELO DE ANALISE DA EXPANSAO A MEDIO PRAZO DE SISTEMAS DE GERACAO DE ENERGIA ELETRICA]

M. LAIDERA Oct. 1982 73 p refs IN PORTUGUESE; ENGLISH summary

(INPE-2558-TDL/104) Avail: NTIS HC A04/MF A01

Some planning aspects concerning to the expansion of Brazilian Electric Power System are presented. It is also presented a model with the aim of formulating and evaluating expansions plans for hydro-thermal generation system characterized by high amount of hydraulic generation, absence of reversible power plants and possibility of long distance energy transmission. Such model gives an expansion plan based upon the scheduling of expansion alternatives, which are classified by their cost/benefit rate, taking into account the influence of new additions on the present system. B.W.

N83-12522# National Aerospace Lab., Tokyo (Japan).

AN EXPERIMENTAL STUDY OF AN AERODYNAMICALLY OPTIMUM WINDMILL

Y. ISHIDA, N. TODA, H. HOSHINO, and M. NOGUCHI 1982 14 p refs In JAPANESE; ENGLISH summary

(NAL-TR-698; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

Aerodynamic characteristics of an optimum horizontal axis windmill are described. The windmill, rated at 20 KW at 8 m/s with a two bladed rotor of 14m diameter, is designed so as to vary the geometry of the blade in such a way that the aerodynamic efficiency becomes maximum. The combined blade element momentum theory is used as an analytical tool. To check the design method and get some useful aerodynamic data, a wind tunnel test of a 1/7th scale model (2m diameter) is performed in a low speed tunnel, whose test section is 35.75 sq m. Two models, whose blades have the same optimum chord distribution but have different planforms, are tested. Measurements are made of the efficiency, torque, axial drag force and initial torque for various combinations of the pitch angle and the tip speed ratio. The yaw characteristics of the windmill are also measured. S.L.

05 ENERGY CONVERSION

N83-12524*# Westinghouse Electric Corp., Pittsburgh, Pa
Advanced Energy Systems Div.
CELL MODULE AND FUEL CONDITIONER DEVELOPMENT
Quarterly Report, Jul. - Sep. 1981

J M FERET Oct. 1981 33 p
(Contract DEN3-161, DE-AI01-80ET-17088)
(NASA-CR-165462-A; DOE/NASA/0161-9A; NAS 1.26:165462-A,
XAL-72760-AL; QR-8) Avail: NTIS HC A03/MF A01 CSCL
10A

A phosphoric acid fuel cell (PAFC) stack design having a 10 kW power rating for operation at higher than atmospheric pressure based on the existing Mark II design configuration is described. Functional analysis, trade studies and thermodynamic cycle analysis for requirements definition and system operating parameter selection purposes were performed. Fuel cell materials and components, and performance testing and evaluation of the repeating electrode components were characterized. The state of the art manufacturing technology for all fuel cell components and the fabrication of short stacks of various sizes were established. A 10 kW PAFC stack design for higher pressure operation utilizing the top down systems engineering approach was developed. S.L.

N83-12526# Von Karman Inst for Fluid Dynamics,
Rhode-Saint-Genese (Belgium)

WIND ENERGY CONVERSION DEVICES

1981 381 p refs Lecture series held at Rhode-Saint-Genese,
Belgium, 1-5 Jun 1981

(VKI-LS-1981-8) Avail: NTIS HC A17/MF A01

Wind energy conversion technology is discussed. Wind turbines are considered. Rotor blades, computer programs, and energy storage are also considered.

N83-12527# National Aerospace Lab., Amsterdam
(Netherlands).

GENERAL INTRODUCTION TO WIND ENERGY CONVERSION

O. DEVRIES In Von Karman Inst for Fluid Dyn Wind Energy
Conversion Devices 127 p 1981 refs

(NLR-MP-81014-U) Avail: NTIS HC A17/MF A01

Different wind turbine and wind concentrator concepts are surveyed. The aerodynamic characteristics of wind turbines are discussed. The choice of the various parameters determining a WECS, such as wind data, turbine control, conversion system, structural, dynamic and cost aspects and environmental impediments is surveyed. The design criteria and the desirability of formulating building codes for WECS are surveyed. Author

N83-12528# IIT Research Inst., Chicago, Ill
SITE CHARACTERISTICS FOR WIND ENERGY CONVERSION DEVICES

R. S. NORMAN In Von Karman Inst for Fluid Dyn. Wind Energy
Conversion Devices 20 p 1981 refs

Avail: NTIS HC A17/MF A01

The importance of wind characteristics and topography in placing a wind energy system are discussed. N.W.

N83-12529# Illinois Inst of Tech., Chicago
HORIZONTAL AND VERTICAL AXIS WIND TURBINES

R. S. NORMAN In Von Karman Inst. for Fluid Dyn. Wind Energy
Conversion Devices 20 p 1981 refs

Avail: NTIS HC A17/MF A01

Horizontal axis wind turbines are discussed. Vertical axis wind turbines are also discussed. Blade configurations are reviewed. N.W.

N83-12530# Saab-Scania, Linkoping (Sweden).
AERODYNAMIC ANALYSIS OF HORIZONTAL AXIS WIND TURBINES

O. A. M. HOLME In Von Karman Inst. for Fluid Dyn Wind
Energy Conversion Devices 40 p 1981

Avail: NTIS HC A17/MF A01

Axial momentum theory, vortex theory and inviscid flow, viscous flow and aerodynamic loads, derivatives of the aerodynamic load, maximum tip speed ratio, turbine design for maximum power,

optimization, and turbines in rotationally unsymmetric flow are discussed. N.W.

N83-12531# Wichita State Univ., Kans. Wind Energy Lab.

AIRFOIL DATA FOR WIND TURBINES

M. H. SNYDER In Von Karman Inst. for Fluid Dyn. Wind Energy
Conversion Devices 18 p 1981 refs

Avail: NTIS HC A17/MF A01

Some of the problems encountered by wind turbine designers in applying aerodynamic characteristics of airfoil sections to design of wind energy conversion systems are reviewed. It is necessary to know airfoil characteristics over a wider range of Reynolds numbers and angles of attack than is necessary for aircraft applications. Some of the studies of the effects of changing airfoils on wind turbine performance are also reviewed. Author

N83-12532# Wichita State Univ., Kans. Wind Energy Lab
CONTROL SYSTEMS FOR HORIZONTAL-AXIS WIND TURBINES

M. H. SNYDER In Von Karman Inst. for Fluid Dyn. Wind Energy
Conversion Devices 20 p 1981 refs

Avail: NTIS HC A17/MF A01

Control requirements for wind turbine systems and problems of conventional controls are discussed. Alternates to pitch control for large horizontal-axis wind turbines are changing pitch of blade tips or use of ailerons or spoilers. Studies were conducted to determine feasibility of using such control systems on the NASA MOD-O machine. Results show that either ailerons or spoilers can provide control necessary to limit turbine power in high wind conditions. An aileron system is recommended for the present application, based upon the ability of ailerons to provide self-starting and added power at low wind speed conditions. The preliminary design study including aileron component sizing and maximum hinge moments was completed and ailerons were fabricated for testing on the MOD-O turbine. Author

N83-12534# Wichita State Univ., Kans. Wind Energy Lab
USERS MANUAL FOR WIND

M. H. SNYDER In Von Karman Inst. for Fluid Dyn. Wind Energy
Conversion Devices 26 p 1981 refs

Avail: NTIS HC A17/MF A01

Information is provided to assist users working with WIND, a program designed to calculate the performance of a wind-axis turbine. Author

N83-12535# Stuttgart Univ. (West Germany). Institute fuer Statik
und Dynamik der Luft- und Raumfahrtkonstruktionen

STATIC AND DYNAMIC ANALYSIS FOR HINGED ROTOR BLADES OF 60 M SPAN FOR A TWO BLADED HORIZONTAL AXIS WIND ENERGY CONVERTER

J. H. ARGYRIS, K. A. BRAUN, and B. KIRCHGAESSNER In
Von Karman Inst. for Fluid Dyn. Wind Energy Conversion Devices

51 p 1981 refs

Avail: NTIS HC A17/MF A01

The static and dynamic behavior of a rotor blade of a horizontal axis wind energy converter with flap- and lag-hinges and with coupling of flap and pitch is investigated. Under the assumption of rigid support of the hub and of constant rotational speed, the linearized equations of motion are developed using a finite element idealization considering quasi-steady aerodynamic forces. The complex eigenfrequencies are calculated. The time history response of the rotor blade is computed for cyclic gravitational loads at rated operation and for a global gust. From the deformation of the structure the stresses at selected points along the blade and forces and moments acting on the tower are calculated. Author

N83-12537# Honeywell Power Sources Center, Horsham, Pa.
HIGH EFFICIENCY LITHIUM-THIONYL CHLORIDE CELL Final Research and Development Technical Report, 10 Apr. 1981 - 9 May 1982

N. DODDAPANENI Aug. 1982 97 p refs
 (Contract DAAK20-81-C-0381; DA PROJ. 1L1-62705-AH-94)
 (AD-A118696; DELET-TR-81-0381-F) Avail: NTIS HC A05/MF A01 CSCL 10C

The polarization characteristics and the specific cathode capacity of Teflon bonded carbon electrodes in the Li/SOCl₂ system have been evaluated. Doping of electrocatalysts such as cobalt and iron phthalocyanine complexes improved both cell voltage and cell rate capability. High efficiency Li/SOCl₂ cells were thus achieved with catalyzed cathodes. The electrochemical reduction of SOCl₂ seems to undergo modification at catalyzed cathode. For example, the reduction of SOCl₂ at FePc catalyzed cathode involves 2-1/2 e-/mole of SOCl₂. Furthermore, the reduction mechanism is simplified and unwanted chemical species are eliminated by the catalyst. Thus a potentially safer high efficiency Li/SOCl₂ can be anticipated. GRA

N83-12564# Agricultural Research Service, Manhattan, Kans.
 Wind Erosion Research Unit.

DARRIEUS WIND-TURBINE AND PUMP PERFORMANCE FOR LOW-LIFT IRRIGATION PUMPING Final Report

L. J. HAGEN and M. SHARIF Oct. 1981 65 p refs Prepared in cooperation with Kansas State Univ., Manhattan
 (Contract DE-AI01-76ET-20319)
 (DE82-016270; CONTRIB-79-435-D; DOE/ARS-3707-20741/81-1)
 Avail: NTIS HC A04/MF A01

In the Great Plains about 15 percent of the irrigation water pumped on farms comes from surface water sources, for the United States as a whole, the figure is about 22 percent. Because of forecast fuel shortages, there is a need to develop alternative energy sources such as wind power for surface water pumping. Specific objectives of this investigation were to: design and assemble a prototype wind powered pumping system for low lift irrigation pumping, determine performance of the prototype system; design and test an irrigation system using the wind powered prototype in a design and test an farm application; and determine the size combinations of wind turbines, tailwater pits, and temporary storage reservoirs needed for successful farm application of wind powered tailwater pumping systems in western Kansas. The power source selected was a two bladed, 6 m diameter, 9 m tall Darrieus vertical axis wind turbine with 0.10 solidity and 36.1 M(2) swept area. DOE

N83-12565# Wynholds (Hans W.) Co., Cupertino, Calif.
SAFETY DATA FOR SMALL WIND SYSTEMS

L. BASS, H. WYNHOLDS, J. BLOEDORN, P. WEIS, and F. HERZOG Sep 1981 111 p refs Prepared for Rockwell International Corp., Golden, Colo.
 (Contract DE-AC04-76DP-03533)
 (DE82-015400; RFP-3305) Avail: NTIS HC A06/MF A01

Technical data and recommendations in the development of small wind energy conversion systems (SWECS) safety standards are provided. A SWECS hazards analysis was prepared using system safety techniques. Hazards are identified, standards are proposed, and other appropriate actions are recommended to reduce to the risk of personal injury or property DOE

N83-12592# Texas A&M Univ., College Station. Dept. of Chemical Engineering.

METAL CHELATE CATALYSTS FOR FUEL CELLS Annual Report

R. DARBAY, R. WHITE, M. YAMANA, and M. TSUTSUE Jul. 1981 34 p
 (Contract GRI-5014-363-0174)
 (PB82-195637; GRI-81/0027) Avail: NTIS HC A03/MF A01 CSCL 10B

A variety of metal chelates were synthesized and evaluated for their activity as oxygen cathode electrocatalysts in strong acidic electrolytes. It was found that Cobalt tetraazaanulene (CoTAA)

and iron phthalocyanine (FePc) exhibit the best activity of all the metal chelates synthesized, but have very limited stability. The proposed solution to this problem is the synthesis of polymeric forms of these chelates, with comparable active and considerably greater stability than the monomers. Three methods for stability testing were developed: (1) Potentiostatic, with periodic measurement of the current potential characteristic; (2) potentiostatic, with continuous monitoring of the current, and; (3) galvanostatic, with continuous monitoring of potential. Each method provides a good evaluation of activity versus time, and the method to be used depends upon the objective of the test. A polymeric form of Co(TAA) was synthesized by means of an acetylene terminated monomer, which in turn was made via a Co(TAA)Br₂ intermediate. The activity of the polymer was found to be comparable to that of Co(TAA) monomer, and significantly greater than that of either the stacked or sheet polymeric forms of Cobalt tetraphenylporphyrine (CoTPP) previously synthesized and tested.

Author (GRA)

N83-12995# Nagoya Univ. (Japan). Inst. of Plasma Physics.
ANALYSIS OF STABILIZATION EFFECT OF QUADRUPOLE FIELD ON THETA PINCH PLASMAS

T. ISHIMURA (Osaka Univ., Japan) Aug. 1982 7 p refs (IPPJ-608) Avail: NTIS HC A02/MF A01

A stability analysis based on MHD approximation was done on the effect of quadrupole field to suppress the $n = 2$ rotational instability occurring in theta pinch plasmas. Applying the analysis to the results of the experiment on the suppression of the instability, the theoretical threshold of $B_{sub S}$ becomes as 0.05 T, while the experimental one is 0.06 T. S.L.

N83-12996# Nagoya Univ. (Japan). Inst. of Plasma Physics.
SUFFICIENT STABILITY CONDITION FOR ALPHA-DRIVEN VELOCITY-SPACE MODES IN COMPRESSION TOKAMAK

K. YAMAZAKI and M. OKAMOTO Sep. 1982 24 p refs (IPPJ-609) Avail: NTIS HC A02/MF A01

The conditions for isotropic velocity space stability in compression Tokamaks and the possibility of thermonuclear instabilities were examined. Magnetic compression heating may invert the velocity distribution of alpha particles, which leads to velocity-space instabilities. A sufficient stability condition is derived for these modes in compression Tokamaks. High field high density compression scenarios like Zephyr satisfy the stability condition, while medium field high temperature compression scheme like FTR may cause exciting velocity space thermonuclear instabilities.

E.A.K.

N83-12997# Nagoya Univ. (Japan). Inst. of Plasma Physics
COMMENTS ON THERMAL RUNAWAY EXPERIMENTS IN SUB-IGNITION TOKAMAKS

K. YAMAZAKI Sep. 1982 15 p refs (IPPJ-610) Avail: NTIS HC A02/MF A01

The rough conditions for thermal runaway due to alpha particle heating to justify deuterium-tritium (D-T) operation of medium sized Tokamaks are examined. Justification of D-T operations from the physics viewpoint is discussed. Optimal thermal runaway experiments in high field, high density compact Tokamaks are suggested within the minimization of the induced radioactivation.

E.A.K.

N83-12998# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

ANISOTROPY IN MHD TURBULENCE DUE TO A MEAN MAGNETIC FIELD

J. V. SHEBALIN, W. H. MATTHAEUS, and D. MONTGOMERY Sep. 1982 43 p refs (NASA-TM-84000; NAS 1.15:84000) Avail: NTIS HC A03/MF A01 CSCL 20I

The development of anisotropy in an initially isotropic spectrum is studied numerically for two-dimensional magnetohydrodynamic turbulence. The anisotropy develops due to the combined effects of an externally imposed dc magnetic field and viscous and resistive dissipation at high wave numbers. The effect is most pronounced

05 ENERGY CONVERSION

at high mechanical and magnetic Reynolds numbers. The anisotropy is greater at the higher wave numbers. Author

N83-13001# California Univ., Livermore. Lawrence Livermore Lab.

PLASMA PARTICLE MEASUREMENTS USING NEUTRAL-PARTICLE-BEAM ATTENUATION

J. H. FOOTE, A. W. MOLVIK, and W. C. TURNER 7 Jul. 1982 48 p refs

(Contract W-7405-ENG-48)

(DE82-021120; UCID-19422) Avail: NTIS HC A03/MF A01

Intense and energetic neutral particle beam injection used for fueling or heating magnetically confined, controlled fusion experimental plasmas which make diagnostic measurements of the plasmas are discussed. The attenuation of an atomic beam when passing through a plasma gives the plasma line density. Orthogonal arrays of highly collimated detectors of the secondary electron emission type are used in magnetic mirror experiments to measure neutral beam attenuation along chords through the plasma volume at different radial and axial positions. The radial array is used to infer the radial plasma density profile; the axial array, to infer the axial plasma density profile and the ion angular distribution at the plasma midplane. DOE

N83-13003# Science Applications, Inc., Boulder, Colo. Plasma Research Inst.

REDUCTION OF NEOCLASSICAL LOSSES IN MAGNETIC-CONFINEMENT DEVICES

J. R. MYRA, D. A. DIPPOLITO, and P. J. CATTO Jul. 1982 12 p refs

(Contract DE-AC03-76ET-53057)

(DE82-020277; SAI-254-82-219-LJ; PRI-46) Avail: NTIS HC A02/MF A01

Transport and direct radial losses result from the departure of particle drift surfaces from magnetic flux (constant pressure) surfaces. In order for a device to have the most favorable neoclassical particle confinement, it is desirable that the drift and flux surfaces remain as close as possible everywhere along the magnetic field. A technique is presented which minimizes this departure by the appropriate modification of the magnetic field geometry. The method is illustrated by determining the optimized fanning for specified mirror magnetic field profiles. DOE

N83-13006# Oak Ridge National Lab., Tenn. Fusion Energy Div.

COMPUTATIONAL METHODS IN TOKAMAK TRANSPORT

W. A. HOULBERG, S. E. ATTENBERGER, and L. L. LAO Jun. 1982 36 p refs

(Contract W-7405-ENG-26)

(DE82-016616) Avail: NTIS HC A03/MF A01

A variety of numerical methods for solving the time dependent fluid transport equations for Tokamak plasmas is presented. Among the problems discussed are techniques for solving the sometimes very stiff parabolic equations for particle and energy flow, treating convection-dominated energy transport that leads to large cell Reynolds numbers, optimizing the flow of a code to reduce the time spent updating the particle and energy source terms, coupling the one dimensional flux-surface-averaged fluid transport equations to solutions of the 2-D Grad-Shafranov equation for the plasma geometry, handling extremely fast transient problems such as internal MHD disruptions and pellet injection, and processing the output to summarize the physics parameters over the potential operating regime for reactors. Emphasis is placed on computational efficiency in both computer time and storage requirements. DOE

N83-13007# Massachusetts Inst of Tech., Cambridge. Plasma Fusion Center.

LOWER-HYBRID-HEATING EXPERIMENTS ON THE ALCATOR C AND THE VERSATOR II TOKAMAKS

M. PORKOLAB, J. J. SCHUSS, Y. TAKASE, S. TEXTER, C. L. FIORE, R. GANDY, M. J. GREENWALD, D. A. GWINN, B. LIPSCHULTZ, E. S. MARMAR et al 1982 15 p refs Presented at the 3rd Intern. Symp. on Heating in Toroidal Devices, Grenoble, France, 22 Mar 1982

(Contract DE-AC02-78ET-51013)

(DE82-013674; DOE/ET-51013/41; PFC/CP-82-5;

CONF-820345-10) Avail: NTIS HC A02/MF A01

Initial results from lower hybrid wave heating experiments carried out on the MIT Alcator-C and Versator II Tokamak are reported. In the Alcator-C experiments a 4 waveguide array, with internally brazed ceramic windows was used to inject 160 kW of microwave power at 4.6 GHz into the plasma with n_0 less than or equal to $1 \times 10^{15} \text{ cm}^{-3}$, and B_0 less than or equal to 12 T. The RF coupling studies show optimal coupling when the local density at the waveguide mouth is 25 to 50 times overdense. Heating experiments show an ion tail formation in hydrogen discharge peaking at a density of anti-n approx. $= 2.7 \times 10^{14} \text{ cm}^{-3}$ at $B = 8.9 \text{ T}$, and bulk ion heating at a density of anti-n approx. $= 1.5 \times 10^{14} \text{ cm}^{-3}$ at B approx. $= 11 \text{ T}$. Evidence of RF current enhancement has been observed at a density of n approx. $= 3 \times 10^{13} \text{ cm}^{-3}$. Doppler broadening of the OVII and NVI lines shows a $(\text{RADICAL})T/\text{sub } 1/2 = 50 \text{ eV}$ rise in the bulk ion temperature. A significant RF produced ion tail is also observed by charge exchange analysis. A toroidal ray tracing code and a 1-D transport code to study the heating density bands and heating efficiencies were successfully combined. DOE

N83-13008# Sandia Labs., Albuquerque, N. Mex. Fusion Energy Div

FUSION ENERGY DIVISION AUTOMATION OF THE ISX-B NEUTRAL BEAMS

S. C. BATES and P. C. HANNA Jun 1982 21 p refs

(Contract W-7405-ENG-26)

(DE82-016369; ORNL/TM-8279) Avail: NTIS HC A02/MF A01

Operation of the two neutral beams on the ISX-B Tokamak was fully automated for an injected power up to 2 MW. A PDP 11/34 FORTRAN program conditions and injects the beams using commercial CAMAC hardware and ad hoc modifications of the beam controls. The fundamental beam conditioning algorithm is based on the breakdown history of the source. Difficulties encountered were noise entering the CAMAC through control and data lines and the lack of well-defined operating heuristics detailed problem diagnostic techniques. A brief description is given of the hardware and software systems, operating techniques, and items of special concern. DOE

N83-13038*# Garrett Turbine Engine Co., Phoenix, Ariz.

ADVANCED GAS TURBINE (AGT) POWERTRAIN SYSTEM DEVELOPMENT FOR AUTOMOTIVE APPLICATIONS

Semiannual Progress Report, Jul. - Dec. 1980

Jul. 1981 151 p refs

(Contract DEN3-167)

(NASA-CR-165329, DOE/NASA-0167-81-2; NAS 1.26:165329,

GTEC-31-3725(2); SAPR-2) Avail: NTIS HC A08/MF A01

CSCL 13F

An automotive gas turbine powertrain system which, when installed in a 1985 production vehicle (3000 pounds inertia weight), is being developed with a CFDC fuel economy of 42.8 miles per gallon based on Environmental Protection Agency (EPA) test procedures and diesel No. 2 fuel. The AGT-powered vehicle shall give substantially the same overall vehicle driveability and performance as a comparable 1985 production vehicle powered by a conventional spark ignition powertrain system (baseline system). Gaseous emissions and particulate levels less than: $\text{NO}_x = 0.4 \text{ gm/mile}$, $\text{HC} = 0.41 \text{ gm/mile}$, and $\text{CO} = 3.4 \text{ gm/mile}$, and a total particulate of 0.2 gm/mile , using the same fuel as used for fuel economy measurements is expected, along with the ability to use a variety of alternate fuels. S.L. q

N83-13359*# Pittsburgh Univ.,
LOSSES IN CHOPPER-CONTROLLED DC SERIES MOTORS
Final Report

H. B. HAMILTON Apr. 1982 127 p refs
 (Contract NSG-3163, DE-AI01-77CS-51044)
 (NASA-CR-167845; DOE/NASA-3163-1; NAS 1.26:167845)
 Avail: NTIS HC A07/MF A01 CSCL 09C

Motors for electric vehicle (EV) applications must have different features than dc motors designed for industrial applications. The EV motor application is characterized by the following requirements. (1) the need for highest possible efficiency from light load to overload, for maximum EV range, (2) large short time overload capability (The ratio of peak to average power varies from 5/1 in heavy city traffic to 3/1 in suburban driving situations) and (3) operation from power supply voltage levels of 84 to 144 volts (probably 120 volts maximum). A test facility utilizing a dc generator as a substitute for a battery pack was designed and utilized. Criteria for the design of such a facility are presented. Two motors, differing in design detail, commercially available for EV use were tested. Losses measured are discussed, as are wave forms and their harmonic content, the measurements of resistance and inductance, EV motor/chopper application criteria, and motor design considerations S.L.

N83-13372# Chalmers Univ of Technology, Goteborg (Sweden).
 Dept of Electrical Machinery

SOME METHODS TO CONNECT A WINDPOWER INDUCTION GENERATOR TO THE UTILITY NETWORK

O. CARLSSON and J. HYLANDER Apr. 1981 6 p refs
 (DE82-750057; NE/VIND-81/4) Avail: NTIS (US Sales Only)
 HC A02/MF A01, DOE Depository Libraries

When an induction generator is switched on to a grid, heavy inrush currents may appear, which may result in a transient voltage variation. By using inductors or thyristors in series with the generator, or capacitor excitation before synchronizing it, the inrush currents could be limited to acceptable levels. DOE

N83-13589*# National Aeronautics and Space Administration.
 Lewis Research Center, Cleveland, Ohio.

METHODS OF REDUCING ENERGY CONSUMPTION OF THE OXIDANT SUPPLY SYSTEM FOR MHD/STEAM POWER PLANTS

A. J. JUHASZ 1983 15 p Proposed for presentation at the 21st Aerospace Sci. Meeting, Reno, Nev., 10-13 Jan. 1983; sponsored by AIAA
 (Contract DE-AI01-77ET-10769)
 (NASA-TM-83025; DOE/NASA/10769-28; E-1461; NAS 1.15:83025) Avail: NTIS HC A02/MF A01 CSCL 10B

An in-depth study was conducted to identify possible improvements to the oxidant supply system for combined cycle MHD power plants which would lead to higher thermal efficiency and reduction in the cost of electricity, COE. Results showed that the oxidant system energy consumption could be minimized when the process was designed to deliver a product O₂ concentration of 70 mole percent. The study also led to the development of a new air separation process, referred to as liquid pumping and internal compression. MHD system performance calculations show that the new process would permit an increase in plant thermal efficiency of 0.6 percent while allowing more favorable tradeoffs between magnetic energy and oxidant system capacity requirements. Author

N83-13608# Naemnden foer Energiproduktionsforskning,
 Stockholm (Sweden).

INTERACTION IN LIMITED ARRAYS OF WINDMILLS

C. CRAFOORD Mar. 1979 54 p refs
 (DE82-750056, NE/VIND-80/39) Avail: NTIS (US Sales Only)
 HC A04/MF A01; DOE Depository Libraries

The problem of how closely packed an array of windmills can be erected without unduly interfering with each other was investigated. Earlier results for neutral stratification are presented in a slightly different manner, more fully illustrating the tradeoff between windmill density and mean efficiency as function of group

size. A variation in mean efficiency of 13% for a group with 80 units, which may correspond to a factor of 2.5 in area coverage is indicated. A dynamic one dimensional planetary boundary layer (PBL) model is presented and redesigned for simulation experiments. The regeneration of the wind profiles behind a windmill unit is studied for different ambient conditions. A variation of up to a factor of 9 in the rate of regeneration of the profiles was found. The use of a statistical approach with lateral homogenization of the wind profiles is discussed. DOE

N83-13625# Sandia Labs., Albuquerque, N. Mex
FORCED VIBRATION ANALYSIS OF ROTATING STRUCTURES WITH APPLICATION TO VERTICAL AXIS WIND TURBINES

D. W. LOBITZ 1981 22 p refs Presented at the 5th Biennial Wind Energy Conf. and Workshop, Washington, D. C., 5 Oct. 1981

(Contract DE-AC04-76DP-00789)
 (DE82-000620; SAND-81-2141C; CONF-811043-1) Avail: NTIS HC A02/MF A01

Predictive methods for the dynamic analysis of wind turbine systems are important for assessing overall structural integrity and fatigue life. For the former, the identification of resonance points (spectral analysis) is of primary concern. For the latter forced vibration analysis is necessary. These analyses are complicated by the fact that, for a spinning turbine, the stress-producing deformations take place in both fixed and rotating reference systems simultaneously. As an example, the tower of a horizontal axis wind turbine (HAWT) must be analyzed in a fixed frame, and the rotor in a rotating one. Forced vibration analysis is further complicated in that accurate models need to be developed for aeroload prediction. Methods which are available for forced vibration analysis of both horizontal and vertical axis machines are identified and the method which was developed for vertical axis wind turbines is emphasized, with some comparisons of the predictions to experimental data. DOE

N83-13633# Gamze-Korobkin-Caloger, Inc., Chicago, Ill.
THE 40KW FUEL CELL FIELD TEST SUPPORT Final Report,
Mar. 1980 - May 1981

J. A. ORLANDO and M. G. GAMZE Feb. 1982 66 p refs
 (Contract GRI-5041-344-0192)
 (PB82-231630; GRI-80/0101) Avail: NTIS HC A04/MF A01 CSCL 10B

GRI and the gas utilities are supporting a field test as one step forward in the commercialization of fuel cells. Broad programmatic oriented activities conducted by GKC include: preparation and presentation of a seminar on guidelines for use by individual utilities, first in the screening of candidate sites and then for use in the design of the fuel cell site mechanical and electrical interfaces; performance of an error analysis for site instrumentation; and participation in the GRI/utility review of the UTC development of a fuel cell Add-On Package which will allow gnd connected 40 kW units. GKC also provided consulting support to individual utilities. Author (GRA)

N83-13714# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

WIND-ENERGY PROGRAM: FY 1982 THIRD QUARTERLY REVIEW

R. MITCHELL, R. J. NOUN, T. FLAIM, M. DEUTSCH, S. HOCK, H. SKLAR, and N. D. KELLEY Aug. 1982 33 p refs
 (Contract DE-AC02-77CH-00178; EG-77-C-01-4042)
 (DE82-019928; SERI/PR-211-1672) Avail: NTIS HC A03/MF A01

The objective, accomplishments, planned activities, output, and subcontracts are briefly summarized for each of the following tasks of the Wind Energy Program: program management and planning, wind energy conversion systems (WECS) application in nongenerating utilities, technical feasibility of stand-alone small WECS (SWECS), WECS performance/value analysis, wind energy industry analysis, wind systems coordination, wind workshops, noise and television interference studies, and advanced and innovative wind energy concepts. Each task summary includes a milestone

05 ENERGY CONVERSION

chart. Also given are lists of research and development subcontracted projects for FY 1981 and FY 1982, principal subcontractors for FY 1982 projects, and current Wind Energy Program publications DOE

N83-13974# Department of Energy, Washington, D. C.
SPECIAL-PURPOSE MATERIALS FOR MAGNETICALLY CONFINED FUSION REACTORS Annual Progress Report
J. L. SCOTT, comp. Nov. 1981 114 p
(DE82-005310; DOE/ER-0113; APR-3) Avail: NTIS HC A06/MF A01

Fusion reactor materials problems other than the first-wall and blanket structural materials are discussed. Components that are considered as special purpose materials include breeding materials, coolants, neutron multipliers, barriers for tritium control, materials for compression and OH coils and waveguides, graphite and SiC, heat-sink materials, ceramics, and materials for high-field superconducting magnets. DOE

N83-13989# Nagoya Univ. (Japan). Inst. of Plasma Physics.
ANALYSIS OF TARGET IMPLSION IRRADIATED BY PROTON BEAM. 1: BEAM INTERACTION WITH TARGET PLASMA
M. TAMBA (Inst. of Physical and Chemical Research, Saitama, Japan), N. NAGATA (Tokyo Inst. of Technology, Yokohama, Japan), S. KAWATA (Tokyo Inst. of Technology, Yokohama, Japan), and K. NIU (Tokyo Inst. of Technology, Yokohama, Japan) Oct. 1982 54 p refs
(IPPJ-612) Avail: NTIS HC A04/MF A01

Numerical simulations and analyses are given for the implosion of a hollow shell target driven by proton beams. The target consists of layers of Pb, Al, and DT. The Pb and Al layers play roles of a tamper and a pusher, respectively. The main part of the beam energy is deposited in the Al layer. But the process of deposition depends much on the distribution of incident angles and particle energies. As the Al layer is heated by proton beams, the layer expands and pushes the DT layer toward the target center. This kind of implosion motion is examined by using a similar solution for the slab model. The effect of inhomogeneities on implosion is shown to be severe. The fluctuation of temperature in the Al layer must be less than 10% and the deviation of the pusher thickness from the average should be less than microns to keep a high target gain. Author

N83-13990# Nagoya Univ. (Japan). Inst. of Plasma Physics.
NON-CIRCULAR BUMPY TORUS
A. TSUSHIMA, H. TSUCHIDATE, T. KAMIMURA, M. FUJIWARA, and H. IKEGAMI Jul 1982 35 p refs
(IPPJ-607) Avail: NTIS HC A03/MF A01

A bumpy torus with noncircular coils is studied analytically and numerically with respect to the confinement of high energy passing particles. The minimum position $r_{sub Jmin}$ of the longitudinal invariant J , and the confinement area sP for passing particles ($V^*/V = 1$) are calculated for the evaluation of confinement performance. As one example of noncircular bumpy tori, the inverse dee bumpy torus is found to be much superior to a circular one with the same aspect ratio when its value is large enough (A approx. 20). M.G.

N83-13993# Sandia Labs., Albuquerque, N. Mex.
BEAM AND DEPOSITION STABILITY IN LIGHT-ION FUSION TARGETS
J. A. SWEGLE Mar. 1982 64 p refs
(Contract DE-AC04-76DP-00789)
(DE82-017768; SAND-82-0072) Avail: NTIS HC A04/MF A01

The plasma stability of beam target and deposition processes in parameter regimes appropriate to light ion driven inertial confinement fusion targets were reviewed. Electrostatic and electromagnetic streaming instabilities driven by a charge and current neutralized ion beam are emphasized. It is assumed that the beam is collisionless and that the target medium is homogeneous and infinite in extent. The two thermal instabilities which are discussed are: a potentially unstable interaction involving ion beam range shortening as the target temperature increases,

and fluid condensation instability. It is found that the range shortening interaction are a stable process. DOE

N83-13994# Oak Ridge National Lab., Tenn.
FUSION RESEARCH AT ORNL
Mar. 1982 89 p refs
(Contract W-7405-ENG-26)

(DE82-017766; ORNL/TM-8316) Avail: NTIS HC A05/MF A01
The ORNL fusion program which includes the experimental and theoretical study of two different classes of magnetic confinement schemes is outlined. The study includes systems with helical magnetic fields, such as the Tokamak and stellarator, and the ELMO Bumpy Torus (EBT) class of toroidally linked mirror systems; the development of technologies, including superconducting magnets, neutral atomic beam and radio frequency (rf) heating systems, fueling systems, materials, and diagnostics; the development of the environment impact of magnetic fusion; and the design of advanced demonstration fusion devices. DOE

N83-13996# Los Alamos Scientific Lab., N. Mex.
EQUILIBRIUM POLOIDAL FIELD DISTRIBUTIONS IN REVERSED-FIELD-PINCH TOROIDAL DISCHARGES
D. A. BAKER, L. W. MANN, and K. F. SCHOENBERG Apr. 1982 38 p refs
(Contract W-7405-ENG-36)
(DE82-014130; LA-9L62-MS) Avail: NTIS HC A03/MF A01

A comparison between the analytic formulae of Shafranov for equilibrium in axisymmetric toroidal reversed field pinch (RFP) systems and fully toroidal numerical solutions of the Grad-Shafranov equation is presented as a function of poloidal beta, internal plasma inductance, and aspect ratio. The Shafranov formula for the equilibrium poloidal field distribution is accurate to within 5% for aspect ratios greater than 2, poloidal betas less than 50%, and for plasma current channels that exceed one-third of the minor toroidal radius. The analytic description for the center shift of the innermost flux surface that encloses the plasma current (the Shafranov shift) is accurate to within 15% for aspect ratios greater than 2 and poloidal betas below 50%, provided the shift does not exceed one-tenth of the minor conducting boundary radius. The behavior of the magnetic axis shift as a function of plasma parameters is included. The Shafranov formulae provide a convenient method for describing the equilibrium behavior of an RFP discharge. Examples illustrating the application of the analytic formulae to the Los Alamos ZT-40M RFP experiment are given. DOE

N83-13997# California Univ., Livermore. Lawrence Livermore Lab.
FEASIBILITY STUDY OF A FISSION-SUPPRESSED TANDEM-MIRROR HYBRID REACTOR
J. D. LEE, R. W. MOIR, and W. L. BARR Apr. 1982 813 p refs
(Contract W-7405-ENG-48)
(DE82-019375; UCID-19327) Avail: NTIS HC A99/MF A01

Results of a conceptual design study of a U-233 producing fusion breeder consisting of a tandem mirror fusion device and two types of fission suppressed blankets are presented. The majority of the effort was devoted to the conceptual design and evaluation of the two blankets. However, studies in the areas of fusion engineering, reactor safety, fuel reprocessing, other fuel cycle issues, economics, and deployment were also performed. DOE

N83-13998# Wisconsin Univ., Madison.
POLOIDAL OHMIC HEATING IN A MULTIPOLE
D. J. HOLLY, S. C. PRAGER, and J. C. SPROTT Jul. 1982 22 p refs
(Contract DE-AC02-76ET-53051)
(DE82-019888; DOE/ET-53051/42) Avail: NTIS HC A02/MF A01

The feasibility of using poloidal currents to heat plasmas confined by a multipole field was examined experimentally in Tokapole 2, operating the machine as a toroidal octupole. The

plasma resistivity ranges from Spitzer to about 1500 times Spitzer resistivity, as predicted by mirror-enhanced resistivity theory. This allows large powers (approx. 2 MW) to be coupled to the plasma at modest current levels. However, the confinement time is reduced by the heating, apparently due to a combination of the input power location (near the walls of the vacuum tank) and fluctuation-enhanced transport. Current-driven drift instabilities and resistive MHD instabilities appear to be the most likely causes for the fluctuations. DOE

N83-13999# Oak Ridge National Lab., Tenn.
ORNL INTEGRAL EXPERIMENT TO PROVIDE DATA FOR EVALUATING MAGNETIC-FUSION-ENERGY SHIELDING CONCEPTS. PART 1: ATTENUATION MEASUREMENTS
 G. T. CHAPMAN, G. L. MORGAN, and J. W. MCCONNELL Aug. 1982 156 p refs
 (Contract W-7405-ENG-26)
 (DE82-019775; ORNL/TM-7356-PT-1) Avail: NTIS HC A08/MF A01

Integral experiments to measure the energy spectra of neutrons and gamma rays due to the transport of approximately 14 MeV T(d,n) (4)He neutrons through laminated stainless steel and borated polyethylene shield configurations were performed at the Oak Ridge National Laboratory. An NE 213 detector and conventional pulse shape discrimination circuitry were used to record the pulse height distributions from which the energy spectra were derived. Descriptions of the facility and experimental techniques are given along with tables and curves showing the results of the measurements. DOE

N83-14000# Science Applications, Inc., Boulder, Colo. Plasma Research Inst.
RADIAL GUIDING-CENTER DRIFTS AND OMNIGENITY IN BUMPY-TORUS CONFINEMENT SYSTEMS
 R. D. HAZELTINE and P. J. CATTO Jul. 1982 27 p refs
 (DE82-019802; SAI-254-82-200-LJ; PRI-45) Avail: NTIS HC A03/MF A01

Collisional transport of a high temperature plasma across the confining field of a bumpy torus magnetic confinement system which depends sensitively upon the functional form of the radial guiding center drift, and thus upon details of the confinement geometry is discussed. A general and relatively explicit formula for the radial drift is derived, using the large aspect-ratio results of a previous equilibrium study. Allowance is made for: (1) arbitrary toroidal variation of the confining field; (2) field distortion due to plasma currents; (3) noncircular deformation of the toroidal field coils. The analysis pertains only to the plasma core, and not to the high beta annuli (electron rings) which are usually present in experiments. The question of bumpy torus omnigenity whether any bumpy torus field configuration is consistent with a vanishing, or nearly vanishing, radial drift, is also investigated. It is found that omnigenity does not occur in the vicinity of the magnetic axis. DOE

N83-14151# State Univ. of New York at Buffalo, Amherst.
INVESTIGATION OF POWER PROCESSING TECHNOLOGY FOR SPACECRAFT APPLICATIONS Final Report, 1 May 1981 - 31 Mar. 1982
 A. S. GILMOUR, JR. Jun. 1982 35 p refs
 (Contract F33615-81-C-2011; AF PROJ. 3145)
 (AD-A119644; AFWAL-TR-82-2054) Avail: NTIS HC A03/MF A01 CSCL 10C

This report summarizes an investigation of power processing technology applicable to future satellite electrical power systems. The issues of AC vs DC distribution are addressed as is the optimum distribution voltage. DC distribution is recommended. Distributions voltage should be as high as practical but less than 270 volts. Author (GRA)

N83-14156# R and D Associates, Arlington, Va.
RESEARCH NEEDS: PRIME-POWER FOR HIGH ENERGY SPACE SYSTEMS Final Report, 26 Oct. 1981 - 31 Jul. 1982
 P. J. TURCHI Jun. 1982 100 p refs
 (Contract F49260-82-C-0008; AF PROJ. 2308)
 (AD-A119243; AFOSR-82-0717TR) Avail: NTIS HC A05/MF A01 CSCL 10B

By the year 2000, an increasingly large portion of our national defense will depend on space-based systems. As part of a broader set of new research initiatives in support of space systems, the Air Force Office of Scientific Research is sponsoring basic research that may be applicable to the development of megawatt-level space prime-power systems. (The emphasis of this particular new initiative is prime-power versus pulsed power including power conditioning, such as fly-wheel or inductive storage, for which there are existing programs.) To assist AFOSR, R and D Associates organized a special conference on prime-power for high-energy space systems, compiled the proceedings of the conference, and provided a review document identifying basic research areas in support of future space prime-power development. This document is the Appendix of the present report. The intent has been to focus on basic vs applied research and to provide guidance and assistance to prospective researchers. In this last regard, a bibliography of space prime-power is contained in the appended document.

Author (GRA)

N83-14545# Sandia Labs., Albuquerque, N. Mex.
STRUCTURAL-DYNAMIC-RESPONSE CHARACTERISTICS OF DARRIEUS VERTICAL AXIS WIND TURBINES
 W. N. SULLIVAN 1981 26 p refs Presented at the 5th Biennial Wind Energy Conf. And Workshop, Washington, D.C., 5 Oct. 1981
 (Contract DE-AC04-76DP-00789)
 (DE82-003583; SAND-81-1760C; CONF-811043-10) Avail: NTIS HC A03/MF A01

Operational experience with Darrieus type vertical axis wind turbines (VAWTs) indicated that a variety of dynamic issues can affect structural performance of the system. The observation and analysis of structural dynamic responses in the VAWT were divided among three major aspects of the system: rotor vibrations, torsional response of the drive train, and transverse vibrations of the cables. This division is not arbitrary, but can be accurately decoupled from each other in most circumstances. The status of the analytical tools, the quantity and quality of existing experimental confirmation data, and the implications structural dynamic issues have on rotor design are discussed.

N83-14684*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LITHIUM/SULFUR DIOXIDE CELL AND BATTERY SAFETY
 G. HALPERT and A. ANDERSON Nov. 1982 19 p refs
 (NASA-RP-1099; NAS 1.61:1099) Avail: NTIS HC A02/MF A01 CSCL 10C

The new high-energy lithium/sulfur dioxide primary electrochemical cell, having a number of advantages, has received considerable attention as a power source in the past few years. With greater experience and improved design by the manufacturers, this system can be used in a safe manner provided the guidelines for use and safety precautions described herein are followed. In addition to a description of cell design and appropriate definitions, there is a safety precautions checklist provided to guide the user. Specific safety procedures for marking, handling, transportation, and disposal are also given, as is a suggested series of tests, to assure manufacturer conformance to requirements. Author

05 ENERGY CONVERSION

N83-14688*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

THE EFFECT OF YAW ON HORIZONTAL AXIS WIND TURBINE LOADING AND PERFORMANCE

J. C. GLASGOW, R. D. CORRIGAN, and D. R. MILLER 1980 22 p refs Presented at the fifth Biennial Wind Energy Conf. and Workshop, Washington, D.C., 5-7 Oct. 1980, sponsored by DOE

(Contract DE-AI07-76ET-20320)

(NASA-TM-82778; E-1108, DOE/NASA/20320-35; NAS

1.15.82778) Avail: NTIS HC A02/MF A01 CSCL 10A

The Mod-0 100 kW experimental wind turbine was tested to determine the effects of yaw on rotor power, blade loads and teeter response. The wind turbine was operated for extended periods at yaw angles up to 49 deg to define average or mean response to yaw. It was determined that the effect of yaw on rotor power can be approximated by the cube of the velocity normal to the rotor disc as long as the yaw angle is less than 30 deg. Blade bending loads were relatively unaffected by yaw, but teeter angle increased with wind speed as the magnitude of the yaw angle exceeded 30 deg indicating a potential for teeter stop impacts at large yaw angles. No other adverse effects due to yaw were noted during the tests. S.L.

N83-14689*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

MEASURED PERFORMANCE OF A TIP-CONTROLLED, TEETERED ROTOR WITH AN NACA 64 SUB 3-618 TIP AIRFOIL

R. D. CORRIGAN, J. C. GLASGOW, and P. J. SIROCKY 1982 16 p refs Presented at the Wind and Solar Energy Conf., Kansas City, Mo., 5-7 Apr 1982

(Contract DE-AI01-76ET-20320)

(NASA-TM-82870; DOE/NASA/20320-40, E-1240, NAS

1.15.82870) Avail: NTIS HC A02/MF A01 CSCL 10A

Tests were conducted on the Mod-O 100 kW Wind Turbine to determine the performance of a tip-controlled rotor having an NACA 64 sub-618 airfoil over the moveable outboard 30% of the blade, while operating at nominal rotor speeds of 21 and 31 rpm. Tests were conducted at two rotor speeds to assess the performance improvement which could be realized with 2-speed operation. Test data are compared with analytical predictions and concluding remarks are presented. The results indicate a clear performance improvement for the 2-speed operation. Author

N83-14690*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

DOE/NASA LEWIS LARGE WIND TURBINE PROGRAM

R. L. THOMAS 1982 15 p refs Presented at the Natl. Rural Elec. Coop. Assoc. and DOE Rural Elec. Wind Energy Workshop, Boulder, Colo., 1-3 Jun. 1982

(Contract DE-AI01-76ET-20320)

(NASA-TM-82991; DOE/NASA/20320-42; E-1423; NAS

1.15.82991) Avail: NTIS HC A02/MF A01 CSCL 10A

An overview of the large wind turbine activities managed by NASA is given. These activities include results from the first and second generation field machines (Mod-0A, -1, and -2), the status of the Department of Interior WTS-4 machine for which NASA is responsible for technical management, and the design phase of the third generation wind turbines (Mod-5) R.J.F.

N83-14691*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

ASSESSMENT OF ALTERNATIVE POWER SOURCES FOR MOBILE MINING MACHINERY

J. E. CAIRELLI, W. A. TOMAZIC, D. G. EVANS, and J. L. KLANN Dec. 1981 109 p refs

(NASA-TM-82695, E-978; NAS 1.15.82695) Avail: NTIS HC

A06/MF A01 CSCL 08I

Alternative mobile power sources for mining applications were assessed. A wide variety of heat engines and energy systems was examined as potential alternatives to presently used power systems. The present mobile power systems are electrical trailing

cable, electrical battery, and diesel - with diesel being largely limited in the United States to noncoal mines. Each candidate power source was evaluated for the following requirements: (1) ability to achieve the duty cycle, (2) ability to meet Government regulations; (3) availability (production readiness); (4) market availability; and (5) packaging capability. Screening reduced the list of candidates to the following power sources: diesel, stirling, gas turbine, rankine (steam), advanced electric (batteries), mechanical energy storage (flywheel), and use of hydrogen evolved from metal hydrides. This list of candidates is divided into two classes of alternative power sources for mining applications, heat engines and energy storage systems. E.A.K.

N83-14693* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

GAS-TO-HYDRAULIC POWER CONVERTER Patent

C. W. GALLOWAY, inventor (to NASA) 27 Feb. 1981 7 p

Filed 27 Feb. 1981 Supersedes N81-24445 (19 - 15, p 2063)

(NASA-CASE-MSC-18794-1; US-PATENT-4,360,325,

US-PATENT-APPL-SN-238785, US-PATENT-CLASS-417-399;

US-PATENT-CLASS-74-110) Avail: US Patent and Trademark Office CSCL 10B

A gas piston driven hydraulic piston pump is described in which the gas cycle is of high efficiency by injecting the gas in slugs at the beginning of each power stroke. The hydraulic piston is disposed to operate inside the as piston, and the two pistons, both slidably but nonrotatably mounted, are coupled together with a rotating but non-sliding motion transfer ring extending into antifriction grooves in the sidewalls of the two pistons. To make the hydraulic piston move at a constant speed during constant hydraulic horsepower demand and thus exert a constant pressure on the hydraulic fluid, these grooves are machined with variable pitches and one is the opposite of the other, i.e., the gas piston groove increases in pitch during its power stroke while the hydraulic piston groove decreases. Any number of piston assembly sets may be used to obtain desired hydraulic horsepower.

Official Gazette of the U.S. Patent and Trademark Office

N83-14740# Naval Civil Engineering Lab., Port Hueneme, Calif. **OPERATING AND MAINTENANCE EXPERIENCE WITH A 6-KW WIND ENERGY CONVERSION SYSTEM AT NAVAL STATION, TREASURE ISLAND, CALIFORNIA Technical Report, Sep. 1979 - Jun. 1981**

D. PAL Jul. 1982 55 p

(AD-A119389; NCEL-TN-1641) Avail: NTIS HC A04/MF A01 CSCL 10B

This report describes in detail the experience gained and lessons learned from the 6-kW grid-integrated Wind Energy Conversion System (WECS) demonstration at Naval Station, Treasure Island, San Francisco Bay. The objective of this demonstration was to develop operating experience and maintenance information on the 6-kW WECS using a combination of permanent magnet alternator with a line commutated synchronous inverter. The on-site measurements conducted during the demonstration indicate that the WECS site has annual average windspeeds of about 8 to 10 mph. The test results to date indicate a satisfactory performance of the WECS except for two failures involving arcing at the electrical terminals located on the yaw shaft. Due to wind characteristics encountered at the site, the performance data collected to date are at windspeeds of 20 mph or lower. For evaluating the WECS performance at all windspeeds, location at a windier site with annual average windspeeds of 14 mph or higher is recommended. Author (GRA)

N83-14746# Virginia Polytechnic Inst. and State Univ., Blacksburg.
Dept. of Engineering Science and Mechanics.
GUST STRUCTURE ANALYSIS FOR WECS: DESIGN AND PERFORMANCE ANALYSIS

R. E. AKINS Dec. 1981 156 p refs
(Contract DE-AC06-79ET-23007)
(DE82-005321; DOE/ET-23007/80/2) Avail: NTIS HC A08/MF A01

The gust structure of the wind at a mid-Atlantic coastal location is documented. Three definitions of gust structure are developed, and data corresponding to two distinct flow regimes, onshore and offshore, are presented. These two cases correspond to very different upwind terrain and offer two distinct flows at one site. Detailed three dimensional wind measurements, obtained using a 76-m meteorological tower located on the coast of the Atlantic Ocean at Wallops Island, Virginia, were utilized. In all instances the number of gusts per unit time increases with mean wind speed and turbulence intensity and decreases with increasing height. The duration of the gusts increases with height and mean wind speed, their amplitude decreases with height and increases with turbulence intensity. It may be possible to predict the amplitude of discrete gusts directly from information concerning the turbulence intensity. DOE

N83-14747# California Univ., Livermore. Lawrence Livermore Lab

ENERGY AND TECHNOLOGY REVIEW

Jun 1982 28 p refs
(Contract W-7405-ENG-48)
(DE82-019371; UCRL-52000-82-6) Avail: NTIS HC A03/MF A01

Reviews of research programs are presented. Fast and precise measurement techniques to meet the demanding specifications for microsphere targets used in inertial confinement fusion experiments are described. A program in which a Raman spectroscopy microprobe is used to perform molecular structure analyses on submicron size particles is discussed. The first year of the controlled thermonuclear reactions program is reported. DOE

N83-14756# Sandia Labs., Albuquerque, N. Mex.

THE 17-M VAWT PROGRAM

R. O. NELLUMS 1981 22 p refs Presented at the 5th Biennial Wind Energy Conf. and Workshop, Washington, D.C., 5 Oct. 1981
(Contract DE-AC04-76DP-00789)
(DE82-003497; SAND-81-1756C, CONF-811043-11) Avail: NTIS HC A02/MF A01

The commercial potential of the 17 m, 100 kW Darrieus Vertical Axis Wind Turbine (VAWT) is discussed. Long term testing is in progress. As the first commercially adapted Darrieus turbines built by DOE, the superior cost, structural integrity, and output characteristics demonstrated by the prototypes appear particularly promising. DOE

N83-14760# Sandia Labs., Albuquerque, N. Mex.

AERODYNAMICS AND PERFORMANCE TESTING OF THE VAWT

P. C. KLIMAS 1981 11 p refs Presented at the 5th Biennial Wind Energy Conf. and Workshop, Washington, D.C., 5 Oct. 1981
(Contract DE-AC04-76DP-00789)
(DE82-003574; SAND-81-1702C; CONF-811043-9) Avail: NTIS HC A02/MF A01

Relatively inexpensive changes to the current aerodynamic design which may bring about reductions in cost of energy (COE) and increases in reliability for VAWT systems are discussed. This design uses blades of symmetrical cross section mounted such that the radius from the rotating tower centerline is normal to the blade chord at roughly the 40% chord point. The envisioned changes to this existing design are intended to: (1) lower cut in windspeed; (2) increase maximum efficiency; (3) limit maximum aerodynamic power; and (4) limit peak aerodynamic torques. Experiments to better understand the aerodynamics of a section

operating in an unsteady, curvilinear flowfield and achieve some of the desired changes in section properties are described. GRA

N83-15104# California Univ., Berkeley. Lawrence Berkeley Lab.

LAWRENCE BERKELEY LABORATORY NEUTRAL-BEAM ENGINEERING TEST FACILITY POWER-SUPPLY SYSTEM

I. C. LUTZ, C. A. ARTHUR, G. J. DEVRIES, and H. M. OWREN Oct. 1981 5 p refs Presented at the 9th Symp. on Engr. Probl. of Fusion Res., Chicago, 26-29 Oct. 1981
(Contract W-7405-ENG-48)
(DE82-003044; LBL-12722; CONF-811040-86) Avail: NTIS HC A02/MF A01

The Lawrence Berkeley Laboratory is upgrading the neutral beam source test facility into a neutral beam engineering test facility (NBETF) with increased capabilities for the development of neutral beam systems. The NBETF will have an accel power supply capable of 170 kV, 70 A, 30 sec pulse length, 10% duty cycle; and the auxiliary power supplies required for the sources. The major components, their ratings and capabilities, and the flexibility designed to accommodate the needs of source development are described. DOE

N83-15110# Illinois Univ., Urbana. Fusion Studies Lab.

ADVANCED FUEL CONCEPTS AND APPLICATIONS

G. H. MILEY 1981 13 p refs Presented at Meeting and Workshop on Fusion Reactor Design and Technol., Tokyo, 5 Oct. 1981
(Contract DE-AS02-76ET-52040)
(DE82-002710; COO-2218-230; CONF-811046-10) Avail: NTIS HC A02/MF A01

Advanced fuel (AF) fusion cycles when potentially offer improved environmental compatibility and lower costs are discussed. This comes about by elimination of tritium breeding requirements and by a reduction in neutron flux. Also a larger energy fraction carried by charged particles makes direct energy conversion more suitable. As a first application, a symbiotic system of semicatalyzed deuterium fueled hybrid fuel factories, supplying both fission fuel to light water reactors and 3He to D-3He satellite fusion reactors, is proposed. Subsequently, an evolution into a system of synfuel factories with satellite D-3He reactors is envisioned. GRA

N83-15111# California Univ., Livermore. Lawrence Livermore Lab.

ASSESSMENT OF SOME OF THE PROBLEMS IN THE USA OF SUPERCONDUCTING MAGNETS FOR FUSION RESEARCH

D. N. CORNISH 5 Nov. 1981 3 p Presented at the 9th Symp. on Engr. Probl. of Fusion Res., Chicago, 26-29 Oct. 1981
(Contract W-7405-ENG-48)
(DE82-003066; UCRL-86877; CONF-811040-105) Avail: NTIS HC A02/MF A01

Problems encountered during the development of superconductors and superconducting magnets for fusion are discussed. Under estimation and development and fabrication of superconductors are considered. DOE

N83-15116# Sandia Labs., Albuquerque, N. Mex.

PULSED POWER FOR INERTIAL-CONFINEMENT FUSION

T. H. MARTIN, J. P. VANDEVENDER, D. L. JOHNSON, E. L. NEAU, W. B. BOYER, J. T. CROW, and B. N. TURMAN 1981 4 p refs Presented at the 9th Symp. on Engr. Problems of Fusion Res., Chicago, 26 Oct. 1981
(Contract DE-AC04-76DP-00789)
(DE82-001991; SAND-81-2446C; CONF-811040-35) Avail: NTIS HC A02/MF A01

Pulsed power development for inertial confinement fusion continues at a rapid rate. The scalability of these types of pulse power systems has been successfully demonstrated during the past few years through a continuum of fully modular, pulsed power accelerators at Sandia which include Proto I at 1 TW, Proto II at 11 TW, PBFA-I at 30 TW, and the projected PBFA-II at 100 TW. Several problems which have limited previous technology to a

05 ENERGY CONVERSION

few tens of terawatts have been solved or appear to have solutions. Several of these solutions are being incorporated into the PBFA-II baseline design which will be introduced. DOE

N83-15117# California Univ., Livermore Lawrence Livermore Lab

HEAVY-ION INERTIAL FUSION: INITIAL SURVEY OF TARGET GAIN VERSUS ION-BEAM PARAMETERS

R. O. BANGERTER, J. W. K. MARK, and A. R. THIESSEN 26 Oct 1981 12 p refs Presented at the 22nd Ann Meeting of the Div of Plasma Phys of the APS, San Diego, Calif. 10-14 Nov. 1980

(Contract W-7405-ENG-48)

(DE82-003069; UCRL-84821-REV-1; CONF-801119-5-REV-1)

Avail: NTIS HC A02/MF A01

Inertial-fusion targets have been designed for use with heavy-ion accelerators as drivers in fusion energy power plants. We have made an initial survey of target gain versus beam energy, power, focal radius, and ion range. This provides input for understanding the trade-offs among accelerator designs. DOE

N83-15118# Sandia Labs., Albuquerque, N. Mex.

PARTICLE-BEAM FUSION Progress Report, Jul. - Dec. 1980

Oct. 1981 141 p refs

(Contract DE-AC04-76DP-00789)

(DE82-003107; SAND-81-0683) Avail: NTIS HC A07/MF A01

Progress in research of particle beam fusion is reported. The following topics are discussed: (1) fusion target studies, (2) target experiments, (3) particle beam source theory, (4) diagnostics development, (5) particle beam experiments, (6) pulsed power research, and (7) pulsed power applications. GRA

N83-15126# Nagoya Univ. (Japan). Inst. of Plasma Physics.

PROCEEDINGS OF INTERNATIONAL TOPICAL MEETING ON ICF RESEARCH BY LIGHT-ION BEAM

K. YATSUI, ed. Oct. 1982 163 p refs Meeting held at Nagaoka, Japan, 11-12 May 1982 Sponsored in part by the Ministry of Education, Science and Culture of Japan (IPPJ-611) Avail: NTIS HC A08/MF A01

High-brightness proton beams (.4 MA, 1 MV) have recently been extracted from 20 sq cm axial pinch-reflex diodes (PRDs) mounted on the NRL Gamble II generator. A source power brightness 10 TW/sq cm RAD(2) was achieved in these experiments. A new barrel-shaped equatorial PRD that can be coupled to PBFA-II has also been operated on Gamble II and has demonstrated 50% proton efficiency with predominantly azimuthally-symmetric charged-particle flow. In other experiments the stopping of power deuterons in hot plasmas was measured using a PRD on Gamble II. Results show about 40% enhancement in stopping power over that in cold targets when the beam was focused to about .25 MA/sq cm. Research is also being performed on transporting ion beams in large-diameter channels (.25 cm) and on a post-transport, plasma-filled, magnetic-focusing section to bring the beam to pellet dimensions. Author

N83-15132# Wisconsin Univ., Madison. Dept. of Nuclear Engineering.

FUSION MATERIALS: ADAPTING TO REALISTIC REACTOR ENVIRONMENTS

G. L. KULCINSKI Oct. 1981 25 p refs Presented at the Meeting and Workshop on Fusion Reactor Design and Technol., Tokyo, 5-16 Oct. 1981 Sponsored in part by the Wisconsin Electric Utilities Research Foundation (Contract DE-AS02-78ET-52048)

(DE82-002708; DOE/ET-52048/21; UWFD-437;

CONF-811046-11) Avail: NTIS HC A02/MF A01

There has been considerable movement in the fusion materials field since the last International Workshop on Reactor Design was held in Madison (1977). Some of the movement has been forward; e.g., we now have much better theoretical descriptions of the melting, vaporization, and electromechanical stresses imposed on first wall material during plasma disruptions. Some of the movement has been sideways, e.g., the Fusion Materials Irradiation Test

Facility (FMIT) now has slipped 3 years in its schedule since the last conference 4 years ago. Finally, there has been very little progress in the fields of pulsed damage simulation for Inertial Confinement Fusion (ICF) Systems, definition of the radiation spectra from ICF targets, or the experimental determination of disruption characteristics for magnetic fusion devices. Several new ideas have appeared since 1977 such as the use of low swelling martensitic alloys, the use of a much more favorable breeding material, Pb83Li17, and there have been two major efforts to design materials test facilities: INTOR and TASKA. DOE

N83-15133# California Univ., Livermore. Lawrence Livermore Lab.

UTILIZING SUBCOOLED, SUPERFLUID HE-II IN THE DESIGN OF A 12-TESLA TANDEM-MIRROR EXPERIMENT

R. W. HOARD, D. N. CORNISH, R. W. BALDI, and W. D. TAYLOR 11 Nov. 1981 10 p refs Presented at the Workshop on Stability of Superconducting in He-I and He-II, Saclay, France, 16-19 Nov. 1981 Prepared in cooperation with General Dynamics, San Diego, Calif.

(Contract W-7405-ENG-48)

(DE82-003322; UCRL-86326; CONF-811140-1) Avail: NTIS HC A02/MF A01

A design study of 12-T yin-yang coils for a conceptual tandem mirror next step (TMNS) facility was performed. The large magnets have major and minor radii of 3.7 and 1.5 m, 0.70 x 3.75 sq m cross section, 46.3 MA turns, and an overall current density of 1765 A/sq cm, obtained by the use of Nb3Sn and Nb-Ti superconductors. Each coil is composed of several subcoils separated by internal strengthening substructure to react the enormous electromagnetic forces. The size of the yin-yang coils, and hence the current density, was reduced by utilizing subcooled, superfluid He-II at 1.8 K for the coolant. The design study is reviewed with emphasis on He-II heat transport and conductor stability. Methods are also presented which allow the extension of Gorter-Mellink-channel calculations to encompass multiple, interconnecting coolant channels. DOE

N83-15134# California Univ., Livermore. Lawrence Livermore Lab.

DESIGNS OF TANDEM-MIRROR FUSION REACTORS

G. A. CARLSON, W. L. BARR, B. M. BOGHOSIAN, R. S. DEVOTO, J. N. DOGGETT, G. W. HAMILTON, B. M. JOHNSTON, J. D. LEE, B. G. LOGAN, R. W. MOIR et al. 1 Oct. 1981 21 p refs Presented at the Meeting and Workshop on Fusion Reactor Design and Technol., Tokyo, 5-16 Oct. 1981

(Contract W-7405-ENG-48)

(DE82-000845; UCRL-86576; CONF-811046-8) Avail: NTIS HC A02/MF A01

A comparative evaluation of several end plug configurations for tandem mirror fusion reactors with thermal barriers were completed. The axi-cell configuration was selected for further study. The axi-cell end plug has a simple mirror cell produced by two circular coils followed by a transition coil and a yin-yang pair, which provides for MHD stability. DOE

N83-15135# Wisconsin Univ., Madison. Dept. of Nuclear Engineering.

CONCEPTUAL DESIGN FOR A MODULAR-STELLARATOR FUSION-REACTOR MAGNET

S. W. VANSIVER, A. KHALIL, K. Y. YUAN, and I. N. SVIATOSLAVSKY Oct. 1981 5 p refs Presented at the 9th Symp. on Eng. Probl. of Fusion Res., Chicago, 26-29 Oct. 1981

(Contract DE-AS02-78ET-52048)

(DE82-002863; DOE/ET-52048/22; UWFD-448,

CONF-811040-114) Avail: NTIS HC A02/MF A01

The design of a modular stellarator fusion reactor UWTOR-M is examined. The reactor configuration employs 18 twisted toroidal field coils with a major radius of 24.1 m, a minor radius of 4.77 m and a field of 5.5 tesla on axis. The conductor is bath cooled with pressurized superfluid helium to achieve high current density cryostability. The coil case is a stainless steel structure designed to withstand bending moments resulting from self force on the

05 ENERGY CONVERSION

individual coil and the interactive force between adjacent coils. Force components in the radial, poloidal and toroidal directions are calculated for the individual coils using EFFI. These loads are transferred through fiberglass composite struts to a room temperature central concrete column. GRA

N83-15136# California Univ., Livermore. Lawrence Livermore Lab
MAGNET AND CONDUCTOR DEVELOPMENTS FOR THE MIRROR FUSION PROGRAM
 D. N. CORNISH 9 Oct. 1981 18 p refs Presented at the US-Japan Superconductive Magnetic Energy Storage Workshop, Madison, Wis., 19-23 Oct. 1981
 (Contract W-7405-ENG-48)
 (DE82-001062; UCRL-86777; CONF-811051-1) Avail: NTIS HC A02/MF A01

The conductor development and the magnet design and construction for the MFTF are described. Future plans for the mirror program and their influence on the associated superconductor development program are discussed. Progress to develop large, high field, multifilamentary Nb₃Sn superconductors and the feasibility of building a 12-T yinyang set of coils for the machine to follow MFTF is summarized. Possible magnetic configurations and requirements for mirror reactors are surveyed. GRA

N83-15139# California Univ., Livermore. Lawrence Livermore Lab.
ANALYTICAL AND NUMERICAL CALCULATIONS OF FIELD-REVERSED THETA-PINCH EQUILIBRIA BASED ON A GENERALIZED HILL'S VORTEX MODEL
 D. V. ANDERSON, J. H. HAMMER, and D. C. BARNES Oct. 1981 5 p refs Presented at the 4th Ann. Compact Toroid Symp., Livermore, Calif., 27-29 Oct. 1981
 (Contract W-7405-ENG-48)
 (DE82-003150; UCRL-86831; CONF-811087-13) Avail: NTIS HC A02/MF A01

Methods for numerically extending the analytic solutions of field reversed theta pinch equilibria so that the results may be used in various stability and dynamics studies were investigated. Generalizations of elliptical Hill's equilibria which accommodate separatrixes with more rectangular shapes and which allow plasma to exist outside the separatrix were used. Although the equilibria are specified analytically inside the plasma surface, numerical techniques are required to generate the solution in the vacuum region. Two computer codes were used in sequence. The first determines a set of external coils and their currents so that they match the known coil field inside the plasma. Then, given this coil field, we compute the contribution from the plasma currents to the fields in the vacuum region. DOE

N83-15140# Sandia Labs., Albuquerque, N. Mex.
TRANSPORT OF LIGHT-ION BEAMS IN PLASMA CHANNELS
 J. N. OLSEN 1981 9 p refs Presented at 9th Symp. on Eng. Problems of Fusion Res., Chicago, Ill., 26 Oct. 1981
 (Contract DE-AC04-76DP-00789)
 (DE82-001649; SAND-81-1333C; CONF-811040-34) Avail: NTIS HC A02/MF A01

Experimental work of ions which propagated in wire initiated and laser initiated discharge channels is reported. Intense beams of light ions are transported over distances of 1 to 2 meters in plasma channels in progress toward inertial confinement fusion driven by particle beams. Particular emphasis is given to studies on laser initiation and channel stability. GRA

N83-15141# Oak Ridge National Lab., Tenn.
RESISTIVE MHD STUDIES OF HIGH-BETA-TOKAMAK PLASMAS

V. E. LYNCH, B. A. CARRERAS, H. R. HICKS, J. A. HOLMES, and L. GARCIA 1981 40 p refs Presented at European Workshop on the Behavior of Magnetically Confined plasmas, Wildhaus, Switzerland, 9 Sep 1981
 (Contract W-7405-ENG-26)
 (DE82-001478; CONF-810947-4-DRAFT) Avail: NTIS HC A03/MF A01

Numerical calculations have been performed to study the MHD activity in high-beta Tokamaks such as ISX-B. These initial value calculations built on earlier low beta techniques, but the beta effects create several new numerical issues. These issues are discussed and resolved. In addition to time-stepping modules, our system of computer codes includes equilibrium solvers (used to provide an initial condition) and output modules, such as a magnetic field line follower and an X-ray diagnostic code. The transition from current driven modes at low beta to predominantly pressure driven modes at high beta is described. The nonlinear studies yield X-ray emissivity plots which are compared with experiment. DOE

N83-15142# Los Alamos Scientific Lab., N. Mex.
MULTIDIMENSIONAL MHD COMPUTATIONS FOR THE FIELD-REVERSED THETA PINCH AND THE REVERSED-FIELD PINCH

D. D. SCHNACK 1981 11 p refs Presented at the US/Japan Workshop on 3D MHD Studies for Toroidal Devices, Oak Ridge, Tenn., 19 Oct. 1981
 (Contract W-7405-ENG-36)
 (DE82-004361; LA-UR-81-3527; CONF-8110101-2) Avail: NTIS HC A02/MF A01

Some large scale numerical MHD simulations of field reversed theta pinch and reversed field pinch devices are described. DOE

N83-15143# Sandia Labs., Albuquerque, N. Mex.
DEUTERIUM FLUX MEASUREMENTS IN THE EDGE PLASMAS OF PLT AND PDX DURING AUXILIARY HEATING EXPERIMENTS

W. R. WAMPLER, S. A. COHEN (Princeton Univ.), H. F. DYLLA (Princeton Univ.), D. M. MANOS (Princeton Univ.), and C. W. MAGEE (RCA Labs.) 1981 14 p refs Presented at the Am. Vacuum Soc. Natl. Symp., Anaheim, Calif., 3 Nov. 1981
 (Contract DE-AC04-76DP-00789)
 (DE82-001909; SAND-81-2205C; CONF-811113-25) Avail: NTIS HC A02/MF A01

The flux of deuterium in the plasma edge several centimeters outside the limiter were measured using collector probes during neutral beam heating experiments on the PDX Tokamak and RF heating experiments on the PLT Tokamak. The dependence of the flux on the distance from the plasma was determined, and the time dependence of the flux was measured with a time resolution of 90 ms. In PDX the deuterium flux decreased rapidly with increasing distance from the plasma. The deuterium flux increased strongly when the beams came on and decreased when they turned off. The depth distribution of the deuterium in the samples, measured using SIMS, shows that when the beams are on about 30% of the deuterium incident on the probe is superthermal deuterium from the beams. In the deuterium flux decreased only slightly with increasing distance from the plasma. The ICRH heating in PLT caused an increase of about 30% in the flux of deuterium to the samples and in the plasma density. In both machines the deuterium fluxes were fairly low at the positions sampled. DOE

05 ENERGY CONVERSION

N83-15144# Technische Hogeschool, Eindhoven (Netherlands). Direct Energy Conversion Group.

EFFECT OF RADIATION AND NON-MAXWELLIAN ELECTRON DISTRIBUTION ON RELAXATION PROCESSES IN AN ATMOSPHERIC CESIUM SEEDED ARGON PLASMA

C. A. BORGHI, A. VEEFKIND, and J. M. WETZER Mar. 1982 30 p refs
(EUT-82-E-124; ISBN-90-6144-124-2) Avail: NTIS HC A03/MF A01

A model, describing the time dependent behavior of a noble gas MHD generator plasma, was set up. The model calculates the relaxation for ionization or recombination as a stepwise temperature development, once the initial and final conditions are given. Radiative transitions and a deviation from Maxwellian electron distribution are included in the model. Radiation causes an enhancement of both the ionization relaxation time and the recombination relaxation time. A non-Maxwellian electron distribution results in an increase of the relaxation time for an ionizing plasma because of an underpopulation of the high energy electrons. A decrease of the relaxation time for a recombining plasma is caused by an overpopulation of high energy electrons. The relaxation time is strongly dependent on the seed ratio and the temperature step. Author (ESA)

N83-15176*# Mechanical Technology, Inc., Latham, N. Y. Stirling Engine Systems Div.

AUTOMOTIVE STIRLING ENGINE DEVELOPMENT PROGRAM Semiannual Technical Progress Report, 1 Jul. - 31 Dec. 1981

W. ERNST, S. PILLER, A. RICHEY, M. SIMETKOSKY, and M. ANTONELLI, ed. Sep 1982 84 p refs
(Contract DEN3-32; EC-77-A-31-10040)
(NASA-CR-167907-2; NAS 1.26:167907; DOE/NASA-0032-15; REPT-82ASE248SA1) Avail: NTIS HC A05/MF A01 CSCL 13F

Activities performed on Mod I engine testing and test results, progress in manufacturing, assembling and testing of a Mod I engine in the United States, P40 Stirling engine dynamometer and multi-fuels testing, analog/digital controls system testing, Stirling reference engine manufacturing and reduced size studies, components and subsystems, and computer code development are summarized. Author

N83-15177*# Mechanical Technology, Inc., Latham, N. Y. Stirling Engine Systems Div.

AUTOMOTIVE STIRLING ENGINE DEVELOPMENT PROGRAM Semiannual Technical Progress Report, 1 Jan. - 30 Jun. 1982

N. NIGHTINGALE, W. ERNST, A. RICHEY, M. SIMETKOSKY, and M. ANTONELLI, ed. Oct. 1982 65 p refs
(Contract DEN3-32; EC-77-A-31-10040)
(NASA-CR-167907-1; NAS 1.26:167907; DOE/NASA-0032-15; REPT-82ASE278SA2) Avail: NTIS HC A04/MF A01 CSCL 13F

Activities performed on Mod I engine testing and test results; the manufacture, assembly, and test of a Mod I engine in the United States; design initiation of the Mod I-A engine system, transient performance testing; Stirling reference engine manufacturing and reduced size studies; components and subsystems; and the study and test of low cost alloys are summarized. Author

N83-15839*# Engelhard Industries, Inc., Edison, N.J. **DEVELOP AND TEST FUEL CELL POWERED ON-SITE INTEGRATED TOTAL ENERGY SYSTEM Quarterly Report**

A. KAUFMAN and G. K. JOHNSON 3 Nov 1982 47 p
(Contract DEN3-241; DE-A101-80ET-17088)
(NASA-CR-168020; NAS 1.26:168020; QR-5) Avail: NTIS HC A03/MF A01 CSCL 10A

Satisfactory performance is reported for the first 12-cell sub-stack of the 5 kW rebuild using improved ABA reactant distribution plates. Construction and test results are described for the first full-sized single-cell test (0.33 m x 0.56 m). Test duration was 450 hours. Plans are outlined for construction and testing of two methanol reformer units based on commercially-available

shell-and-tube heat exchangers. A 5 kW-equivalent precursor and a 50 kW-equivalent prototype will be built. Supporting design and single-tube experimental data are presented. Stack support efforts are summarized on corrosion currents of graphite materials and acid-management of single-cell test facilities. Comparative properties are summarized for the two methanol/steam reforming catalysts evaluated under Task V (now completed); T2107RS and C70-2RS. Author

N83-15841# R and D Associates, Rosslyn, Va. **PROCEEDINGS OF THE AFOSR SPECIAL CONFERENCE ON PRIME-POWER FOR HIGH ENERGY SPACE SYSTEMS, VOLUME 1 Final Report**

P. J. TURCHI 1982 767 p refs Conf. held in Norfolk, Va., 22-25 Feb. 1982 2 Vol.
(Contract F49620-82-C-0008)
(AD-A118887; AFOSR-82-0655TR-VOL-1) Avail: NTIS HC A99/MF A01 CSCL 10B

State-of-the-art space prime-power technology is reviewed. Research needs for progress toward megawatt power levels are discussed. Chemical, nuclear, and radiant energy techniques, power conversion, heat rejection, materials, chemical and fluid physics are discussed.

N83-15842# Boeing Aerospace Co., Seattle, Wash.

POWER REQUIREMENTS FOR MANNED SPACE STATIONS

G. R. WOODCOCK and S. SILVERMAN In R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 1 20 p 1982
Avail: NTIS HC A99/MF A01 CSCL 10B

The power requirements, the tradeoff between batteries and regenerative fuel cells, including how the electric power system can be integrated with other functions, and nuclear concepts are summarized. The influence of mission applications on selection of the power system is discussed, including low Earth orbit and high Earth orbit civil missions and potential military missions. Author

N83-15844# Eagle-Picher Industries, Inc., Joplin, Mo. Electronics Div.

CHEMICAL SOURCES: BATTERY

R. A. BROWN In R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 1 12 p 1982
Avail: NTIS HC A99/MF A01 CSCL 10C

The particular aspects of space power requirements that are critical to batteries are discussed. Power density and energy density values for various electrochemical systems and battery configurations are shown as a function of the time duration of the power pulse. Characteristics of the possible battery systems are listed in order to match specific battery systems to individual power requirements. A general discussion is presented regarding the advantages batteries offer over other types of power sources. Author

N83-15846# R and D Associates, Rosslyn, Va.

MHD POWER: OVERVIEW

J. B. DICKS (Applied Energetics, Inc.) In its Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 1 17 p 1982
Avail: NTIS HC A99/MF A01 CSCL 10B

MHD is one of those technologies which has reached an engineering status that would allow it to be applied where the need for short time high powered systems arise. It has the advantage of almost immediate full power production from a inert start, is thus capable of high reliability, but is limited in time to that available utilizing uncooled heat sink configurations. Such a time at present is of the order of 100-150 seconds with extended lifetime depending on the amount of cooling are placed in the system. All of this technology is based on an engineering understanding of the device, but comparatively little physical understanding. The phenomenon involved are complex, involving a combination of Maxwell's equations with the gasdynamic equations. Furthermore, the phenomena of the boundary layer

between the hot plasma and the cold electrodes are in a even more difficult regime of temperature over shoots, recombination, surface interaction, and prevalent surface phenomena. Author

N83-15847* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

NASA LEWIS RESEARCH CENTER COMBUSTION MHD EXPERIMENT

J. M. SMITH /in R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 1 10 p 1982 refs

Avail: NTIS HC A99/MF A01 CSCL 10B

The MHD power generation experiments were conducted in a high field strength cryomagnet which was adapted from an existing facility. In its original construction, it consisted of 12 high purity aluminum coils pool cooled in a bath of liquid neon. In this configuration, a peak field of 15 tesla was produced. For the present experiments, the center four coils were removed and a 23 cm diameter transverse warm bore tube was inserted to allow the placement of the MHD experiment between the remaining eight coils. In this configuration, a peak field of 6 tesla should be obtainable. The time duration of the experiment is limited by the neon supply which allows on the order of 1 minute of total operating time followed by an 18-hour reliquefaction period. As a result, the experiments are run in a pulsed mode. The run duration for the data presented here was 5 sec. The magnetic field profile along the MHD duct is shown. Since the working fluid is in essence superheated steam, it is easily water quenched at the exit of the diffuser and the components are designed vacuum tight so that the exhaust pipe and demister can be pumped down to simulate the vacuum of outer space. Author

N83-15848# Massachusetts Inst. of Tech., Cambridge. Dept. of Aeronautics and Astronautics.

THE MHD DISK GENERATOR AS A MULTIMEGAWATT POWER SUPPLY OPERATING WITH CHEMICAL AND NUCLEAR SOURCES

J. F. LOUIS /in R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 1 17 p 1982

Avail: NTIS HC A99/MF A01 CSCL 10B

The characteristics, performance and status of the MHD disk generator are reviewed as a potential multimewatt power supply working with both chemical and nuclear sources. The disk generator is found to be a compact high interaction power unit with simple construction simple power conditioning and using a circular superconducting coil. The radial flow of the disk assures zero thrust in open loop operation and its construction simplicity may provide significant reliability and weight advantages. The disk generator can be operated as a high voltage, low current power supply. Experiments have shown the disk generator as high power (900 kW), high power density (500 MW/cu cm), high enthalpy extraction (15%) device which has been operated with electrical fields up to 37 kV/m. The disk generator can be operated in an open loop with either chemical or nuclear heat sources. In a closed cycle system, the disk generator can be used in a Brayton cycle using He working fluid and in a Rankin cycle using either potassium or lithium vapors as working fluid. In both cases, the generator operates in the non-equilibrium mode. Author

N83-15849# STD Research Corp., Arcadia, Calif.

SELF-EXCITED MHD POWER SOURCE FOR SPACE APPLICATIONS

C. D. MAXWELL, C. D. BANGERTER, and S. T. DEMETRIADES /in R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy space Systems, Vol. 1 11 p 1982

Avail: NTIS HC A99/MF A01 CSCL 10B

Small, self-excited, combustion-driven MHD systems with mass-to-power ratios of the order 1 kg/kW and specific energy extraction rates of 0.8 MJ/kg of fuel were tested. Small, self-excited, chemical explosion-driven giant-pulse generators with mass-to-power ratios of the order 0.001 kg/kW and specific energy

extraction rates of 0.4 MG/kg of explosive were tested. The experimental, results to date with CW-MHD and Pulsed MHD devices are extrapolated to the expected performance in the space environment. The fluid mechanics of high-interaction, moderate-to-high magnetic Reynolds number MHD flows govern (and will ultimately limit) the performance of such devices. These fundamental limitations must be properly understood before devices of these or better specifications can be constructed. Author

N83-15850# Argonne National Lab., Ill.

LIQUID-METAL MHD FOR SPACE POWER SYSTEMS

E. S. PIERSON /in R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 1 14 p 1982 refs

Avail: NTIS HC A99/MF A01 CSCL 10B

The two-phase-generator liquid-metal MHD (LMMHD) energy-conversion concept, developed at Argonne National Laboratory, appears very attractive for space applications. It combines the high-temperature capability and high power density of the previous-proposed LMMHD concepts with a high cycle efficiency unattainable with these previous LMMHD concepts. The operation of the Brayton-cycle (gas-cycle) and Rankine-cycle (vapor-cycle) two-phase-generator LMMHD concepts is explained. The key features which make LMMHD attractive for space applications are summarized. The current status of LMMHD technology is discussed, with emphasis on the experimental data. ANL has the technology base to analyze LMMHD systems for space power applications, and to build prototypes at different temperatures. Author

N83-15851# AMAF Industries, Columbia, Md.

SOLAR MHD SYSTEMS WITH TWO-PHASE FLOW WITH MAGNETIC LIQUID METAL

A. GOSWAMI, R. D. GRAVES, and C. SPIGHT /in R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 1 7 p 1982 refs

Avail: NTIS HC A99/MF A01 CSCL 10A

Solar power is one of the major resources available to space systems. Whereas the technology of solar cells and its limitations are well known, there is another technique, solar LMMHD, pioneered by H. Branover and E. Pierson which shows promise as a relatively high efficiency, inexpensive and compact prime power device usable in space. The solar LMMHD system employs a liquid metal to extract heat from a mirror-solar collector system. A second organic volatile liquid is then allowed to come in contact with the hot metal and evaporate. The two phase fluid system then moves along a pipe, the gas imparting part of its flow momentum to the liquid metal. The moving liquid metal passes through a magnetic field perpendicular to the flow direction; thereby an induced current is generated which is collected by the usual electrode ensemble. Author

N83-15852# Avco-Everett Research Lab., Mass.

MAGNETOHYDRODYNAMIC POWER SUPPLY SYSTEMS FOR SPACE APPLICATIONS

D. W. SWALLOM /in R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 1 34 p 1982

Avail: NTIS HC A99/MF A01 CSCL 10B

The MHD power supply system can provide tens of megawatts of electrical power for space applications. The system has substantially operating flexibility for various operating times, pulse lengths and pulse rates, and power levels. The instant on/instant off capability provides the necessary response to command signals. The overall power system is a high efficiency, low mass and volume device which is attractive for space applications. Author

05 ENERGY CONVERSION

N83-15853# SerTec, Cleveland, Ohio.

POTENTIAL ROLE AND TECHNOLOGY STATUS OF CLOSED-CYCLE MHD FOR LIGHT-WEIGHT NUCLEAR SPACE-POWER SYSTEMS

G. R. SEIKEL and B. ZAUDERER /in R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 1 15 p 1982 refs
Avail. NTIS HC A99/MF A01 CSCL 10B

If power is required in space for more than a large fraction of a day, steady state power sources (such as solar and nuclear) will have the lightest system weight. If megawatts of power are needed, closed cycle MHD systems (if successfully developed) have the potential of being very light and highly efficient. Such MHD generators are uniquely capable of fully exploiting advances in high-temperature reactor technology which could make up to 2500 K long-life, iner-gas-cooled reactors feasible. A particularly attractive MHD system is a turbo-MHD cycle which has a turbine driven compressor. It potentially have very low specific mass, high efficiency, and relatively low MHD generator enthalpy extraction.

Author

N83-15854# Stanford Univ., Calif.

MHD GENERATOR RESEARCH AT STANFORD

J. K. KOESTER, C. H. KRUGER, and T. NAKAMURA /in R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 1 22 p 1982 refs
Avail. NTIS HC A99/MF A01 CSCL 10B

The behavior of MHD channels has been studied over a wide range of conditions in the High Temperature Gasdynamics Laboratory at Stanford University. This research is primarily experimental in nature with the use of advanced diagnostic methods and comparable theoretical and numerical studies for the interpretation of the data and application of the results to large-scale generators. Present MHD research areas include MHD boundary layer interactions, Hall-field breakdown, plasma nonuniformities, plasma fluctuations and magneto-acoustic waves, surface deposits of slag, disk generators, and electrode configurations. Plasma velocity, temperature, and electron number density have been measured with spatial and temporal resolution by optical diagnostics. Many channel phenomena such as electrode boundary layer Joule heating, sidewall boundary layer velocity overshoot, slag particle size, effect of radicals on electron density, and surface deposit polarization have been observed, measured, and compared with theory. These results are intended to provide support for MHD hardware development in areas where performance limitations and design constraints are not now adequately understood.

Author

N83-15855# Los Alamos Scientific Lab., N. Mex.

OVERVIEW OF SPACE REACTORS

D. BUDEN /in R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 1 44 p 1982
Avail. NTIS HC A99/MF A01 CSCL 10B

An overview of spacecraft power supplies needed in the future is presented in outline form. Subjects portrayed and discussed are: potential space power missions, space power technology capabilities, conversion technology, radiator technology, and reactor safety.

L.F.M.

N83-15856# Oak Ridge National Lab., Tenn.

TECHNOLOGICAL BOUNDARY CONDITIONS FOR NUCLEAR ELECTRIC SPACE POWER PLANTS

A. P. FRAAS /in R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 1 20 p 1982 refs
Avail. NTIS HC A99/MF A01 CSCL 10B

A serious attempt to assess the potential and feasibility of the many candidates for nuclear electric space power applications must confront some basic technological facts that limit what one can reasonably hope to accomplish with any given concept. First, the upper limit to the efficiency of any thermodynamic cycle was defined by Carnot, and the subsequent 160 years has not only

disclosed the character and magnitude of the many losses that regrettably but inevitably make the efficiency of any actual cycle much less than that of an ideal cycle, but has also shown the upper temperature limit attainable with the materials available for any actual cycle. The cycle efficiency determines not only the thermal energy output of the reactor required for any given electrical power output (and thus the size and weight of the reactor and shield assembly), but also the size and weight of the radiator to reject the waste heat. Materials considerations such as corrosion, strength, and radiation damage at elevated temperatures establish basic limits on the design of the reactor, shield, turbine, generator, and other key components. Allowable radiation doses to personnel, lubricants, elastomers, and electronic components determine the size, weight, and shape of the reactor shield after account is taken of such factors as activation of the reactor coolant, directional differences in the degree of shielding required for the spacecraft in question, and radiation scattering from structures such as the radiator. Further, an exceptionally high reliability with essentially no maintenance is required.

Author

N83-15857# Rasor Associates, Inc., Sunnyvale, Calif.

EFFECTS OF REACTOR DESIGN, COMPONENT CHARACTERISTICS AND OPERATING TEMPERATURES ON DIRECT CONVERSION POWER SYSTEMS

G. O. FITZPATRICK and E. J. BRITT /in R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 1 24 p 1982 refs
Avail. NTIS HC A99/MF A01 CSCL 10B

The results of a parametric study of unmanned space nuclear reactor power systems utilizing either thermoelectric or thermionic energy converters are presented. An in-core reactor design and two heat pipe cooled out-of-core reactor designs were considered. One of the out-of-core designs utilized long heat pipes directly coupled to the energy converters. The second utilized a larger number of smaller heat pipes (mini-pipe) radiatively coupled to the energy converter. In all cases the entire system, including the power conditioning subsystem and its radiator, were constrained to be launched by a single shuttle. The mass and size of each system was studied as a function of several variables including: power level, lifetime, number and size of core heat pipes, fuel swelling model, reactor and heat rejection temperatures, converter type and performance level, allowable radiation dose at the payload, shadow shield cone angle, power conditioning temperature and efficiency, etc. The most critical component determining system performance is the reactor. Its design is driven by concerns for fuel swelling rate which is in turn dependent on the nature of the swelling, reactor power level, and the number and size of the heat pipes used to cool the core.

Author

N83-15858# Westinghouse Electric Corp., Pittsburgh, Pa. Advanced Energy Systems Div

GAS COOLED REACTORS FOR LARGE SPACE POWER NEEDS

G. H. PARKER /in R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 1 21 p 1982
Avail. NTIS HC A99/MF A01 CSCL 10B

Gas cooled space reactors can be built in the next few years and their performance capabilities exceed those of the power conversion systems (PCS) that the reactors will drive. For space applications requiring MW(e), the closed cycle Brayton cycle is a strong candidate for the PCS. For these high power levels, waste heat rejection to space by radiators tends to drive systems to high operating temperatures so that reasonably sized system envelope dimensions can be attained. Thus, compact, high power density, high temperature, high burnup reactors will be needed. The technology base for these reactors is well established.

Author

N83-15859# Brookhaven National Lab., Upton, N. Y. Dept. of Nuclear Energy.

COMPACT, HIGH-POWER NUCLEAR REACTOR SYSTEMS BASED ON SMALL DIAMETER PARTICULATE FUEL

J. R. POWELL and T. E. BOTTS /in R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 1 5 p 1982

Avail: NTIS HC A99/MF A01 CSCL 10B

Two compact, high-power nuclear reactor concepts are discussed. Both are gas-cooled cavity-type reactors which utilize particulate fuel of the type now used in HTGR reactors. Unshielded reactor volumes are on the order of one cubic meter. The Fixed Bed Reactor operating temperature is limited to 2500 K and the output power to 250 MW(e). In the Rotating Bed Reactor fuel is held within a rotating porous metal drum as a rotating fluidized bed. Rotating Bed Reactor outlet temperatures up to 3000 K and output power levels up to 1000 MW(e) are achievable. Both reactors can be brought up from stand by to full power in times on the order of a few seconds, due primarily to the short thermal time constant for the fuel particles. Turbine and MHD Brayton are the power conversion cycles of choice. Open cycle operation is generally favored for applications operating at less than 1000 sec of equivalent integrated full power. At power levels above 1 MW(e), the liquid droplet radiator is the favored means of heat rejection. Power system specific power levels of 10 kW(e)/kg (not including shield) appears to be quite feasible. Author

N83-15860# R and D Associates, Rosslyn, Va.

PROCEEDINGS OF THE AFOSR SPECIAL CONFERENCE ON PRIME-POWER FOR HIGH ENERGY SPACE SYSTEMS, VOLUME 2 Final Report

P. J. TURCHI 1982 834 p refs Conf. held in Norfolk, Va., 22-25 Feb 1982 2 Vol.

(Contract F49620-82-C-0008)

(AD-A118888; AFOSR-82-0656TR-VOL-2) Avail: NTIS HC A99/MF A01 CSCL 10B

The state of the art of space prime power technology is reviewed and research needed for progress toward megawatt power levels is discussed. Radiant energy techniques, materials requirements, chemical physics, thermionics, thermal management systems, and power requirements of future NASA and DOE system are addressed.

N83-15861*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

A PROPOSED OPTICAL PUMPING SYSTEM REQUIRING NO ELECTRIC POWER Final Report

B. R. PHILLIPS /in R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 2 11 p 1982

Avail: NTIS HC A99/MF A01 CSCL 20F

A method for optically pumping a fluid without electrical power is described. The method is based on utilizing the radiation from a metal oxidant combustion reaction that is contained within a transparent tube that is immersed in the medium to be pumped. The reaction initiation and maintenance occurs by gas dynamically induced resonance within the transparent cavity. All that is required is a supply of high pressure oxidant and metallic powder. Materials that were successfully evaluated to date include aluminum, steel, magnesium, and titanium. M.G.

N83-15862# Illinois Univ., Urbana. Fusion Studies Lab
STATUS, RESEARCH REQUIREMENTS AND POTENTIAL APPLICATIONS FOR NUCLEAR PUMPED LASERS Final Report

G. H. MILEY /in R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 2 30 p 1982 refs

Avail: NTIS HC A99/MF A01

Mechanisms and various approaches to nuclear pumping of lasers are reviewed. Experimental results to date (including various noble gas lasers and more recent N₂-He-CO₂ and O₂(1 delta)-I₂ transfer lasers) are briefly noted. Both physics issues (e.g., electron

energy distributions) and technology issues (e.g., coatings vs. UF₆ neutron interaction regions) are identified. Finally, considerations involved in potentially attractive applications such as space nuclear laser systems and neutron feedback inertial confinement fusion are outlined. M.G.

N83-15863# Argonne National Lab., Ill.

PRIME POWER FOR HIGH-ENERGY SPACE SYSTEMS: CERTAIN RESEARCH ISSUES Final Report

E. W. WALBRIDGE /in R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 2 10 p 1982 refs

Avail: NTIS HC A99/MF A01

The physical mechanisms underlying Alfvén wave drag and induced magnetic moment effects on high energy space systems are described. An expression for the induced magnetic moment of a (ring-shaped) satellite is presented. Several other issues requiring attention are also pointed out. These include, in particular, the need to avoid a demise like that of Skylab, how to obtain high heat engine thermal efficiency, what to do about the damaging effects of Van Allen belt radiation, and the need for storing energy over long periods but having it quickly available on short notice. M.G.

N83-15864*# Rasor Associates, Inc., Sunnyvale, Calif.

STATUS OF THERMOELECTRONIC LASER ENERGY CONVERSION, TELEC Final Report

E. J. BRITT /in R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 2 11 p 1982

Avail: NTIS HC A99/MF A01

A concept known as a thermo-electronic laser energy converter (TELEC), was studied as a method of converting a 10.6 micron CO₂ laser beam into electric power. The calculated characteristics of a TELEC seem to be well matched to the requirements of a spacecraft laser energy conversion system. The TELEC is a high power density plasma device which absorbs an intense laser beam by inverse bremsstrahlung with the plasma electrons. In the TELEC process, electromagnetic radiation is absorbed directly in the plasma electrons producing a high electron temperature. The energetic electrons diffuse out of the plasma striking two electrodes which are in contact with the plasma at the boundaries. These two electrodes have different areas: the larger one is designated as the collector, the smaller one is designated as the emitter. The smaller electrode functions as an electron emitter providing continuity of the current. Waste heat is rejected from the collector electrode. An experiment was carried out with a high power laser using a cesium vapor TELEC cell with 30 cm active length. Laser supported plasma were produced in the TELEC device during a number of laser runs over a period of several days. Electric power from the TELEC was observed with currents in the range of several amperes and output potentials of less than 1 volt. M.G.

N83-15866*# Rice Univ., Houston, Tex. Dept. of Space Physics and Astronomy.

THE PHOTOTRON: A LIGHT TO RF ENERGY CONVERSION DEVICE Final Report

J. W. FREEMAN and S. SIMONS /in R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 2 17 p 1982 refs (Contract NAG3-29)

Avail: NTIS HC A99/MF A01

The phototron, a photoelectric device that converts light to radio frequency energy, is described. It is a vacuum tube, free electron, device that is mechanically similar to a reflex klystron with the hot filament cathode replaced by a large area photocathode. The device can operate either with an external voltage source used to accelerate the photoelectrons or with zero bias voltage; in which case the photokinetic energy of the electrons sustains the R.F. oscillations in the tuned R.F. circuit. One basic design of the phototron was tested. Frequencies as high as about 1 GHz and an overall efficiency of about 1% in the biased mode were obtained. In the unbiased mode, the frequencies of operation

05 ENERGY CONVERSION

and efficiencies are considerably lower. Success with test model suggests that considerable improvements are possible through design refinements. One such design refinement is the reduction of the length of the electron flight path. M.G.

N83-15867*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

RADIATION-DRIVEN MHD SYSTEMS FOR SPACE APPLICATIONS Final Report

J. H. LEE (Vanderbilt Univ.) and N. W. JALUFKA /in R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 2 11 p 1982 refs

Avail: NTIS HC A99/MF A01

High-power radiation such as concentrated solar or high-power laser radiation is considered as a driver for magnetohydrodynamic (MHD) systems which could be developed for efficient power generation and propulsion in space. Eight different systems are conceivable since the MHD systems can be classified in two: plasma and liquid-metal MHD's. Each of these systems is reviewed and solar- (or laser-) driven MHD thrusters are proposed. Author

N83-15869# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

OVERVIEW OF HIGH-TEMPERATURE MATERIALS FOR HIGH-ENERGY SPACE POWER SYSTEMS Final Report

N. T. SAUNDERS /in R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 2 39 p 1982

Avail: NTIS HC A99/MF A01 CSCL 10B

The current state of technology and some of the more pressing research needs and challenges associated with the possible use of high temperature materials in future high energy space power systems are discussed. Particularly, emphasis is on the need to improve and quantify the fundamental understanding of the effects of the following: (1) fast neutron radiation on the properties and behavior of nuclear reactor fuels and claddings; and (2) long term, high temperature, space (vacuum) exposure on the properties of refractory metals considered for use as structural materials in various power conversion systems. M.G.

N83-15871# General Atomic Co., San Diego, Calif.

NUCLEAR FUEL SYSTEMS FOR SPACE POWER APPLICATION Final Report

L. YANG /in R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 2 26 p 1982 refs

Avail: NTIS HC A99/MF A01

Work carried out on in-core thermionic fuel-cladding development has indicated that the uranium carbide-tungsten and the uranium oxide-tungsten fuel systems are promising candidates. Materials and fabrication techniques were developed to meet the requirements of the thermionic fuel elements. Out-of-pile and in-pile studies of fuel-cladding compatibility, dimensional stability, and thermionic performance stability were performed for both fuel systems. Accelerated irradiation tests attained a burnup of 3×10 to the 20th power fissions/cu cm for the carbide and the oxide fueled emitters at 1900 K, which is equivalent to that for 40,000 hours of operation of 120 kw thermionic reactor. Prototypical carbide and oxide fueled emitters were tested for 8000 hours at 1740 to 1840 K. Comparatively speaking, the carbide-fueled system exhibited greater dimensional stability than the oxide-fueled system, while the oxide-fueled system exhibited better thermionic performance stability than the carbide-fueled system. The experiences gained in the development of coated fuel particles for the high temperature, gas-cooled reactor are described and the potential of such coated fuel particles for space power application is discussed. M.G.

N83-15872# Westinghouse Research and Development Center, Pittsburgh, Pa.

MATERIALS FOR HIGH POWER MHD SYSTEMS Final Report

B. R. ROSSING /in R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 2 19 p 1982 refs

Avail: NTIS HC A99/MF A01

Electrode and insulator materials requirements for high power magnetohydrodynamic power generators are discussed. Open and closed cycle linear generators are emphasized. Author

N83-15874# Westinghouse Electric Corp., Madison, Pa. Advanced Reactors Div.

APPLICATIONS OF A HIGH TEMPERATURE RADIATION RESISTANT ELECTRICAL INSULATION Final Report

M. H. COOPER /in R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 2 16 p 1982 refs

Avail: NTIS HC A99/MF A01

Electrical components are being developed for service inside the reactor vessel of Fast Breeder Reactors. These components will function in an exceptionally hostile environment combining high temperature (1000 F), chemical activity (liquid sodium), and nuclear radiation (fast neutron fluences to 1021 n/sq cm). Two components which are being developed are an electromagnetically actuated shutdown system and an induction motor. The successful development of a glass-alumina insulation which is suitable for operation at high temperature and in high radiation fields is the key technological advance that has resulted in the development of these components. The insulation is applied by a dipping process similar to conventional enamel insulation utilizing a slurry of glass-alumina in an organic binder. Drying at modest temperature results in a green flexible coating that is adherent to the wire. After the wire is formed into the desired component, the wire is fired at high temperature to eliminate the binder and to fuse the glass mixture to the wire. Electromagnetic coils thus fabricated have been operated for more than 18 months in sodium systems from 850 to 1100 F. Author

N83-15878# Spire Corp., Bedford, Mass.

APPLICATIONS OF MATERIALS SURFACE MODIFICATION TO PRIME POWER SYSTEMS Final Report

F. L. MILDER /in R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 2 14 p 1982 refs

Avail: NTIS HC A99/MF A01

The new technologies of surface modification are ideally suited for space applications. Surface modification offers the ability of custom creating materials with one set of surface properties conjoined to a dissimilar or even mutually exclusive set of bulk properties. The benefit of such specifically engineered materials is an efficiency in component design which translates to weight minimization. Modern surface modification techniques, including ion implantation, sputter deposition, and plasma/ion deposition, deal with thin film layers in the range from a few nanometers to a few micrometers. Ion implantation is unique in that it forcibly injects an element of choice into the near surface region of a material. Thus, alloys or solid solutions are formed unaccompanied by dimensional changes. The numerous and varied deposition techniques, on the other hand, grow coating layers, often with unique properties. B.W.

N83-15886# General Atomic Co., San Diego, Calif.

THERMIONIC CONVERSION FOR SPACE POWER APPLICATION Final Report

L. YANG and G. O. FITZPATRICK /in R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 2 16 p 1982 refs Prepared in cooperation with Rasor Associates, Inc., Sunnyvale, Calif.

Avail: NTIS HC A99/MF A01

Efforts to develop thermionic conversion for space power application are discussed. Tungsten, niobium and Al₂O₃ were selected as the emitter, collect and insulator materials for the

converter. Uranium carbides and uranium oxide were selected as candidates for the nuclear fuel. A total of 36 fueled thermionic converters and fuel elements were life-tested during 1965 to 1972. These tests, supported by a dozen converter tests and several material irradiation tests, provided the base of the in-core thermionic technology. Unfueled converters demonstrated a life of five years or more, while fueled converter fuel elements have been operated for one to one and one-half years. The major limiting factors for converter life and performance were: component diffusion through cladding and emitter cracking for carbide-fueled converters, and emitter swelling for the oxide-fuel converters. Various means for mitigating the fuel effects on converter life and performance were proposed but they were not thoroughly evaluated R.J.F.

N83-15887# Thermo Electron Corp., Waltham, Mass.
THERMIONIC TECHNOLOGY FOR SPACECRAFT POWER: PROGRESS AND PROBLEMS Final Report
 F. HUFFMAN, D. LIEB, P. REAGAN, and G. MISKOLCZY /In R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 2 30 p 1982 refs
 Avail: NTIS HC A99/MF A01

Thermionic conversion for use with space reactors is discussed. Advantages are discussed, as well as development problems. The mechanical simplicity associated with no moving parts implies reliability. The high temperature of heat rejection minimizes the mass of the radiator - which is usually the heaviest component of large space power systems. The high heat rejection temperature also limits the size of the radiator, which is an important consideration, since all space reactor systems in the foreseeable future must fit inside the space shuttle bay. Modularity maximizes reliability by eliminating single point system failures. In addition, thermionics is a demonstrated conversion technology coupled to nuclear reactors. Although available thermionic converter performance yields systems with attractive specific masses of around 20 kG/kWe, higher efficiency and power density are certainly desirable. For space systems, this improvement must accrue from reduced potential losses in the interelectrode plasma since the radiator temperature will be too high to take advantage of collector work functions lower than those already available.

R.J.F.

N83-15888# Carnegie-Mellon Univ., Pittsburgh, Pa.
A SURVEY OF RECENT ADVANCES IN AND FUTURE PROSPECTS FOR THERMIONIC ENERGY CONVERSION Final Report
 J. LAWLESS /In R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 2 8 p 1982
 Avail: NTIS HC A99/MF A01

Some powerful advances in the fundamental understanding of Thermionic Conversion are discussed. Those include numerical computer simulations and simple analytical models. As a consequence of these advances, many new ideas are being developed with the potential for major improvements in thermionic converter performance. In particular, structured electrodes and oscillation effects now show strong possibilities for important improvements. Further, modeling techniques now exist to consider pore converters and third electrode converters in detail whereas past studies were mainly empirical. In summary, greatly superior performance can be expected from future thermionic converters.

R.J.F.

N83-15889# Grumman Aerospace Corp., Bethpage, N.Y.
THERMAL MANAGEMENT OF LARGE PULSED POWER SYSTEMS Final Report
 B. HASLETT /In R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 2 36 p 1982 refs
 Avail: NTIS HC A99/MF A01

Current thermal control technology is reviewed and limitations assessed compared to a typical high pulse power application. Thermal management is a significant weight factor (approximately 50%) of even medium power systems which points to a large

potential payback from innovative techniques. Thermal research is recommended in the areas of concentrating and thermovoltaic solar arrays, two phase heat transport loops, direct contact heat exchangers and advanced radiator systems. Air Force space power trends indicate requirements for systems with 10 to 200 KW average power with pulse/average power ratios of 10/1 to 1000/1. Thermal system definition is complicated by the variety of possible power systems although solar and nuclear (Brayton and Thermionic) appear to be the leading candidates. R.J.F.

N83-15893# Thermacore, Inc., Lancaster, Pa.
ENHANCED HEAT PIPE THEORY AND OPERATION Final Report
 D. M. ERNST and G. Y. EASTMAN /In R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 2 24 p 1982
 Avail: NTIS HC A99/MF A01

Heat pipes to extract heat from the cores of compact fast reactors are discussed. They require unusually high power densities. This performance appears to be feasible, but necessitates more detailed exploration of theoretical and operational limits than has then carried out to date. Closely aligned to heat pipes for heat removal from the core are the low mass high performance, high temperature radiator heat pipes. The areas requiring the greatest attention are the startup and shutdown characteristics of long heat pipes, the limits on wick augmented thin film evaporation (burn out heat flux) and the prediction of the true temperature profile along the heat pipe. It will also almost certainly require exploration and analysis of higher capacity capillary wicks.

R.J.F.

N83-15895# Little (Arthur D.), Inc., Cambridge, Mass.
LIQUID RIBBON RADIATOR FOR LIGHTWEIGHT SPACE RADIATOR SYSTEMS Final Report
 W. P. TEAGAN /In R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 2 13 p 1982
 Avail: NTIS HC A99/MF A01

The liquid metal ribbon (CMR) radiator concept described operates by forming a thin (10-100 micrometers) liquid metal meniscus on a wide mesh screen structure which is drawn through space by a retractable pulley system. The liquid metal bath from which the liquid metal ribbon is formed can be a heat dissipation sink for a spaceborne power system or space thermal control system. Preliminary analysis indicates that radiators formed in this way show promise of achieving weights one tenth to one fourth those of conventional space radiators utilizing heat pipe configurations. Film materials which have been combined include gallium, tin, and lithium. These materials cover a wide range of potential heat rejection temperature needs. Author

N83-15898# Layton (J. Preston), Princeton Junction, N.J.
POWER CONVERSION: OVERVIEW Final Report
 J. P. LAYTON /In R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 2 23 p 1982 refs
 Avail: NTIS HC A99/MF A01

The central position of power conversion systems in relation to other elements of space power systems is identified and the recognized types of power conversion are shown to be: photovoltaic, thermoelectric, Brayton cycle, Rankine cycle, Stirling cycle, thermionic and electromagnetic. The requirement for space electric power levels versus calendar years are presented historically and projected beyond the turn of the century. A number of space power systems that may employ thermoelectric, Brayton, Rankine and magnetohydrodynamic power conversion are illustrated and discussed. The need for mission and systems analyses to support the identification of applied research in power conversion is argued and the approach for conducting these analyses is presented. Author

05 ENERGY CONVERSION

N83-15900# Power Conversion, Inc., Elmwood, N.J.
PRIMARY LITHIUM ORGANIC ELECTROLYTE BATTERY BA-5588 Final Report, Apr. 1979 - Jan. 1981
M. G. ROSANSKY Jul 1982 101 p refs
(Contract DAAK20-79-C-0260)
(AD-A120858; DELET-TR-79-0260-F) Avail: NTIS HC A06/MF A01 CSCL 10C

This program concerns the development, fabrication and evaluation of a Lithium organic electrolyte battery designated BA-5588 (I)/U which incorporates five series connected, hermetically sealed cells housed in a plastic case. Significant effort was directed towards cell optimization through controlled experimentation and evaluation of various design parameters. Demonstration of the effectiveness of the finalized design was accomplished by the performance of various electrical and abuse tests which included environmental exposure, prolonged thermal storage, electrical discharge under various thermal profiles, short circuit and discharge to zero volts as well as forced discharge. The resulting evaluation demonstrated the batteries ability to operate safely under all of the specified abusive environments and provide 100% of the specified service life requirements

Author (GRA)

N83-15901# Gould, Inc., Rolling Meadows, Ill. Materials Lab.
STUDIES LEADING TO THE DEVELOPMENT OF HIGH-RATE LITHIUM-SULFURYL CHLORIDE BATTERY TECHNOLOGY Quarterly Report, 1 Apr. - 30 Jun. 1982
J. C. HALL and M. KOCH Oct. 1982 50 p
(Contract DAAK20-81-C-0420, DA PROJ. 1L1-62705-AH-94)
(AD-A120853; DELET-TR-81-0420-3; QR-3) Avail: NTIS HC A04/MF A01 CSCL 10C

The overall aim of the program is an examination of the viability of an active electrolyte lithium-sulfuryl chloride battery system. The specific objectives are: quantify the stability of lithium in sulfuranyl-chloride based electrolyte. Develop means to stabilize in the lithium anode in sulfuranyl chloride based electrolyte to meet Army storage requirements. Establish the performance limits of Li/SO₂Cl₂ cells with respect to cathode and electrolyte composition

GRA

N83-15903# Massachusetts Inst. of Tech., Cambridge. Dept. of Ocean Engineering.
PRELIMINARY ANALYSIS OF WAVE ENERGY CONVERSION AT AN OFFSHORE STRUCTURE Final Report
A. D. CARMICHAEL, D. ASSANIS, and J. O. SALSICH Sep. 1982 55 p refs
(Contract MIPR-Z-700999-1-00886)
(AD-A120079; USCG-D-65-81) Avail: NTIS HC A04/MF A01 CSCL 10A

A study of the feasibility of utilizing wave energy to provide the electrical power to operate the Buzzards Bay Light Tower has been carried out. It was concluded that a pneumatic buoy attached to the light tower would be the best solution. Experiments were conducted in the MIT Towing Tank to estimate the performance of such a device. The loads imposed by the wave energy device on the power during an extreme storm were estimated and were predicted to be very large. Theoretical and experimental studies have indicated a possible method of reducing the size of the wave energy device by controlling the air pressure in the buoy.

Author (GRA)

N83-15907# National Academy of Sciences - National Research Council, Washington, D. C. Committee on Offshore Energy Technology.
STUDIES LEADING TO THE DEVELOPMENT OF HIGH-RATE LITHIUM SULFURYL CHLORIDE BATTERY TECHNOLOGY Quarterly Report, 1 Jan. - 31 Mar. 1982
J. C. HALL and M. KOCH Sep 1982 58 p refs
(Contract DAAK20-81-C-0420; DA PROJ. 1L1-62705-AH-94)
(AD-A120002; DELET-TR-81-0420-2; QR-2) Avail: NTIS HC A04/MF A01 CSCL 10C

The overall aim of the program is an examination of the viability of an active electrolyte lithium sulfuranyl chloride battery system.

The specific objectives are: (1) quantify the stability of lithium in sulfuranyl chloride solution; (2) explore means to stabilize lithium in sulfuranyl chloride; (3) establish the limits of performance of carbon/teflon cathodes. During the second quarter we: continued characterization of anode stability with respect to cell design and electrolyte composition, determined the voltage delay after storage as a function of electrolyte composition, and characterized the performance at room temperatures of cells with and without performance additives. We found that positive grounding or floating of both electrodes with respect to the case enhance anode stability, the bromine performance additive increases anode stability, the bromine performance additive decrease voltage delay, and the bromine performance additive is superior to the chlorine performance additive in terms of delivered capacity. GRA

N83-15908# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst
FIFTH BIENNIAL WIND ENERGY CONFERENCE AND WORKSHOP (WW5)
I. E. VAS, ed (Flow Industries, Inc.) 1981 539 p refs Conf. held in Washington, D.C., 5-7 Oct. 1981 Sponsored by DOE (DE82-014659, SERI/CP-635-1340-VOL-1; CONF-811043-VOL-1)
Avail: NTIS HC A23/MF A01

Wind energy programs are reviewed. Results of research and development studies were presented in the areas of wind turbine technology, applications, economics, environmental, performance and wind resource. Analysis and improvements to the state of the art are discussed.

N83-15909# Department of Energy, Washington, D. C. Wind Energy Technology Div.
THE FEDERAL WIND ENERGY PROGRAM
L. V. DIVONE In Midwest Res. Inst. Fifth Bien Wind Energy Conf. and Workshop (WW5) p 3-26 1981
Avail: NTIS HC A23/MF A01

The utilization and development of wind energy systems are reviewed. The future of these systems is discussed. S L

N83-15911*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THE NASA LEWIS LARGE WIND TURBINE PROGRAM
R. L. THOMAS and D. H. BALDWIN In Midwest Res. Inst. Fifth Bien. Wind Energy Conf and Workshop (WW5) p 39-58 1981 refs
Avail: NTIS HC A23/MF A01 CSCL 10A

The large wind turbine program activities are reviewed. These activities include results from the first and second generation field machines (Mod-OA, 1, and 2), the design phase of the third generation wind turbine (Mod-5) and the advanced technology projects. The status of the WTS-4 machine is also presented.

S.L

N83-15912# Rockwell International Corp, Golden, Colo. Energy Systems Group.
ROCKY FLATS SMALL WIND SYSTEMS PROGRAM: AN UPDATE
T. J. HEALY and D. M. DODGE In Midwest Res. Inst. Fifth Bien. Wind Energy Conf. and Workshop (WW5) p 59-70 1981
Avail: NTIS HC A23/MF A01

A test center for small wind systems developed at Rocky Flats. This center is now fully established with a complete range of system and component test capabilities. Over 25 commercially available machines were tested. The first of 14 systems development subcontracts was issued to private industry. Twelve prototypes resulting from these subcontracts are now fabricated and under evaluation. Some prototypes have undergone extensive engineering refinement and several are now on the market. A range of activities - including a nationwide field evaluation program - which addressed institutional barriers to small wind systems use was initiated. These activities greatly increased national awareness of small wind systems potential and provided valuable information on wind systems applications, financial and product liability issues, regulatory issues and other subjects. This information is helping

utilities, government agencies and various institutions incorporate small wind systems in the existing power production, financial and regulatory environment. S.L.

N83-15913# Sandia Labs., Albuquerque, N. Mex. Advanced Energy Projects Div.

VERTICAL AXIS WIND TURBINE PROGRAM

R. H. BRAASCH /In Midwest Res. Inst. Fifth Bien. Wind Energy Conf. and Workshop (WW5) p 71-85 1981 refs
(Contract DE-AC04-76DP-00789)

Avail: NTIS HC A23/MF A01

Research investigations suggest that reduction in cost of energy (COE) and increases in reliability for VAWT systems are possible through changes in aerodynamic design. The basic changes desired are: (1) lower cut-in windspeed, (2) increase maximum efficiency, (3) limit maximum aerodynamic power, (4) limit peak aerodynamic torque, and (5) increase rotor rotational speed. Several basic aerodynamic experiments (2) are conducted to better understand the aerodynamics of a section operating in an unsteady, curvilinear flowfield. The experiments include blade chordwise pressure distribution and acceleration surveys, the use of blade sections designed to operate specifically in the VAWT environment (laminar flow profile), blade blowing (boundary layer control), blade cambering, and blade offset/preset pitch (incidence). S.L.

N83-15914# Department of Agriculture, College Station, Calif. Agricultural Research Service.

THE USDA AGRICULTURAL WIND ENERGY RESEARCH PROGRAM

R. N. CLARK /In Midwest Res. Inst. Fifth Bien Wind Energy Conf. and Workshop (WW5) p 85-92 1981 refs

Avail: NTIS HC A23/MF A01

Applications of wind power in agriculture were investigated. Building heating projects were conducted using a 15-kW electrical machine to power resistant heaters, and a 4-kW cycloturbine powered a water churn to heat water. The two projects in product storage and processing provided refrigeration for short and long term storage systems. Milk was cooled at a dairy and exhaust heat from the compressor was used to preheat the hot water. In the other project, apples were cooled and stored for six months. The apple storage system incorporated an ice bank for storage during nonwind periods. The two irrigation experiments involved pumping water from a surface reuse system using a vertical axis wind turbine directly coupled to a turbine pump and wind assist pumping from a deep well by combining a wind turbine with a diesel engine. The wind assist concept saved 40% of fuel normally used in pumping the well. Economic analyses of these applications show that most individual loads on a farm are usually too short in duration to make the unit profitable. S.L.

N83-15916*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

OPERATING EXPERIENCE WITH THE 200 KW MOD-OA WIND TURBINE GENERATORS

A. G. BIRCHENOUGH, A. L. SAUNDERS, T. W. NYLAND, and R. K. SHALTENS /In Midwest Res. Inst. Fifth Bien Wind Energy Conf. and Workshop (WW5) p 107-118 1981 refs

Avail: NTIS HC A23/MF A01 CSCL 10A

The machine configuration and its advantages and disadvantages, particularly as it affects reliability are discussed. The machine performance, both availability and power output characteristics are described. The Mod-OA operational experience is documented. The characteristics of the wind energy generated, the machine performance, and the subsystem strengths and weaknesses are discussed. An assessment of the project success in fulfilling its goals and objectives is also presented. S.L.

N83-15917# WTG Energy Systems, Inc., Buffalo, N.Y.

OPERATIONAL EXPERIENCE ON MP-200 SERIES COMMERCIAL WIND TURBINE GENERATORS

M. ROSE /In Midwest Res. Inst. Fifth Bien. Wind Energy Conf. and Workshop (WW5) p 119-124 1981 refs

Avail: NTIS HC A23/MF A01

Innovations in the areas of blade design, corrosion resistance, control philosophies and the design of critical shutdown mechanisms are discussed. A periodic variation of output power encountered on the MP2-200 and MP3-200, and a proposed solution for these oscillations are also discussed. S.L.

N83-15918# Boeing Engineering and Construction Co., Tukwila, Wash.

TEST STATUS AND EXPERIENCE WITH THE 7.5 MEGAWATT MOD-2 WIND TURBINE CLUSTER

R. A. AXELL and H. B. WOODY /In Midwest Res. Inst. Fifth Bien. Wind Energy Conf. and Workshop (WW5) p 143-156 1981

Avail: NTIS HC A23/MF A01

The Mod-2 wind turbine cluster is described. The site preparation and construction activities are discussed, and preliminary test results, status, and plans are presented. S.L.

N83-15919# General Electric Co., Philadelphia, Pa. Advanced Energy Programs Dept.

CONCEPTUAL DESIGN OF THE 6 MW MOD-5A WIND TURBINE GENERATOR

R. S. BARTON and W. C. LUCAS /In Midwest Res. Inst. Fifth Bien. Wind Energy Conf. and Workshop (WW5) p 157-168 1981

Avail: NTIS HC A23/MF A01

The MOD-5A wind turbine system must generate electricity for 3.75 c/KWH (1980) or less. During the conceptual design phase, the MOD-5A WTC system size and features were established as a result of tradeoff and optimization studies driven by minimizing the system cost of energy (COE). This led to a 400' rotor diameter size. The MOD-5A system which resulted is defined along with the operational and environmental factors that drive various portions of the design. Development of weight and cost estimating relationships and their use in optimizing the MOD-5A are discussed. The results of major tradeoff studies are also presented. Subsystem COE contributions for the 100th unit are shown along with the method of computation. The major subsystems are described in order that the results of the various trade and optimization studies can be more readily visualized. S.L.

N83-15920# Boeing Engineering and Construction Co., Seattle, Wash.

CONCEPTUAL DESIGN OF THE 7 MEGAWATT MOD-5B WIND TURBINE GENERATOR

R. R. DOUGLAS /In Midwest Res. Inst. Fifth Bien. Wind Energy Conf. and Workshop (WW5) p 169-181 1981 refs

Avail: NTIS HC A23/MF A01

Similar to MOD-2, the MOD-5B wind turbine generator system is designed for the sole purpose of providing electrical power for distribution by a major utility network. The cost of electricity (COE) target is reduced from 4c/Kwhr on MOD-2 to 3c/Kwhr on MOD-5B. The MOD-5B concept studies and eventual concept studies and eventual concept selection confirmed that the program COE targets could not only be achieved but substantially bettered. Starting from the established MOD-2 technology as a base, this achievement resulted from a combination of concept changes, size changes, and design refinements. The result of this effort is a wind turbine system that can compete with conventional power generation over significant geographical areas, increasing commercial market potential by an order of magnitude. S.L.

05 ENERGY CONVERSION

N83-15921# Hamilton Standard, Windsor Locks, Conn. Wind Energy Systems Dept.

STATUS OF THE 4 MW WTS-4 WIND TURBINE

R. J. BUSSOLARI /in Midwest Res. Inst. Fifth Bien. Wind Energy Conf. and Workshop (WW5) p 183-192 1981
 Avail: NTIS HC A23/MF A01

The WTS-4 is a four megawatt, horizontal axis wind turbine. The specifications, characteristics and features of the WTS-4 are discussed. The major component such as rotor, nacelle and tower are described and their status in the fabrication phase is presented. S.L.

N83-15925# Kaman Aerospace Corp., Bloomfield, Conn.

THE 40 KW INTERMEDIATE SWECS PROGRAM

B. A. GOODALE /in Midwest Res. Inst. Fifth Bien. Wind Energy Conf. and Workshop (WW5) p 271-282 1981
 Avail: NTIS HC A23/MF A01

A horizontal axis wind turbine rated at 40 kW at 9 m/s is discussed. The system has a 19.5 m (64 ft.) diameter rotor with two fiberglass blades mounted downwind of the tower at a hub height of 23 m (75 ft.). To accommodate various output configurations, a variable pitch rotor with a microprocessor controller is incorporated. The prototype is now under test. The system is briefly described and the test program and results to date are discussed. Some of the development problems encountered and corrected are discussed. The approach to commercialization of such a system is discussed, as are some of the changes to the machine considered necessary for production. R.J.F.

N83-15926# Riso National Lab., Roskilde (Denmark). Test Plant for Small Windmills.

ON THE POWER REGULATION OF SMALL WIND TURBINES BASED ON EXPERIENCE WITH SMALL DANISH WIND TURBINES

P. LUNDSAGER /in Midwest Res. Inst. Fifth Bien. Wind Energy Conf. and Workshop (WW5) p 285-296 1981 refs
 Avail: NTIS HC A23/MF A01

The state of development of the small wind turbines on the Danish market covering a range of 10 to 55 kW, of which approximately 500 are in operation is discussed. A typical feature of Danish small wind turbines is the regulation of the power output by stalling of the rotor blades. The merits of the stall regulation are discussed with respect to both power regulation and structural design and safety. The characteristic benefits and problems are discussed in some detail and compared to those of the pitch regulation. A survey of problems in both methods to be solved by research and development work in the next few years is given. R.J.F.

N83-15927# National Taiwan Univ., Taipei.

THE WIND PROGRAM IN A TYPHOON ENVIRONMENT

Y. S. TSAO /in Midwest Res. Inst. Fifth Bien. Wind Energy Conf. and Workshop (WW5) p 297-304 1981
 Avail: NTIS HC A23/MF A01

The present wind program in the Republic of China (including Taiwan and the off-shore islands under ROC control) is discussed. The collection of wind data in hopeful windmill sites, especially those on offshore islands and coastal areas is discussed. The installation of experimental small wind machines in the above-mentioned sites is described. For example, some small machines will be set up this year in Quemoy for pumping of irrigation water while others will be used for salt-making in the Southern Coast of Taiwan. An evaluation of available Wind energy in Taiwan is given. The assessment of the effect of typhoon on the safety, cost and operation of wind machines is discussed. R.J.F.

N83-15928# Aluminum Co. of America, Alcoa Center, Pa.

ALCOA ALVAWT PROGRAM

F. M. TOWNSEND and R. J. FALKENBERG /in Midwest Res. Inst. Fifth Bien. Wind Energy Conf. and Workshop (WW5) p 311-330 1981

Avail: NTIS HC A23/MF A01

A review of the failure of wind turbines is given. Data from strip-chart recordings are analyzed. Numerous conclusions are drawn regarding various points of system breakdown. It is also concluded that neither the 17 meter nor the 500 kW will be ready for commercialization without another prototype of each. R.J.F.

N83-15929# National Research Council of Canada, Ottawa (Ontario).

MEASUREMENTS ON THE MAGDALEN ISLANDS VAWT AND FUTURE PROJECTS

R. J. TEMPLIN and R. S. RANGI /in Midwest Res. Inst. Fifth Bien. Wind Energy Conf. and Workshop (WW5) p 331-344 1981 refs

Avail: NTIS HC A23/MF A01

The rotor of a 224 kW vertical axis wind turbine (VAWT) is discussed. The rebuilt rotor of the 224 kW Magdalen Islands VAWT was installed in Sept. 1979 and is operating at its design speed (36.6 rpm). Agreement between measured and theoretical performance is generally good except that maximum power may exceed theoretical predictions. Measurements of drive train losses, torque and power ripple, and rotor stresses are discussed. Although peak-to-peak cyclic stress levels are low in relation to fatigue life limits, spectral analysis of stress data indicates that the 3-per-rev component is amplified by near-resonance with the first butterfly blade mode. This resonance was subsequently de-coupled by a damped connection between the blade struts and the central column. R.J.F.

N83-15930# DAF Indal Ltd., Mississauga (Ontario).

REVIEW OF DAF INDAL VAWT COMMERCIALIZATION PROGRAMS

C. F. WOOD, L. A. SCHIENBEIN, and D. J. MALCOLM /in Midwest Res. Inst. Fifth Bien. Wind Energy Conf. and Workshop (WW5) p 345-356 1981 refs. Sponsored in part by the National Research Council of Canada

Avail: NTIS HC A23/MF A01

Commercialization efforts aimed at improvements in the design and manufacture of vertical axis wind turbines (VAWT) are discussed. The development and testing of a wind assisted diesel generator system is discussed. Improvements in the design of a 50 kW VAWT is discussed. The design of a 375 kW system is also discussed. A feasibility study to identify the most cost effective VAWT turbine size is discussed. R.J.F.

N83-15931# Sandia Labs., Albuquerque, N. Mex. Advanced Energy Project Div.

STATUS REPORT OF THE 17-M VAWT PROGRAM

R. O. NELLUMS /in Midwest Res. Inst. Fifth Bien. Wind Energy Conf. and Workshop (WW5) p 359-370 1981 refs
 (Contract DE-AC04-76DP-00789)

Avail: NTIS HC A23/MF A01

Two 17 meter, 100 kW vertical axis wind turbines are discussed. Specifications are given. Production costs are discussed, including hours of labor for various parts. Results of certification tests are given. The structural status of the VAWT's is discussed, with emphasis upon drive train and rotor stresses. R.J.F.

N83-15932# Sandia Labs., Albuquerque, N. Mex. Advanced Energy Projects Div.

STRUCTURAL DYNAMIC RESPONSE CHARACTERISTICS OF DARRIEUS VERTICAL AXIS WIND TURBINES

W. N. SULLIVAN /in Midwest Res. Inst. Fifth Bien. Wind Energy Conf. and Workshop (WW5) p 371-384 1981 refs
 (Contract DE-AC04-76DP-00789)

Avail: NTIS HC A23/MF A01

A brief summary of the efforts now underway in the area of the structural dynamics of vertical axis wind turbines is given. The

emphasis is on discussing the status of analytical tools, the quantity and quality of existing experimental confirmation data, and the implications structural dynamic issues have on rotor design.

R.J.F.

N83-15933# Sandia Labs., Albuquerque, N Mex. Advanced Energy Projects Div.

AERODYNAMICS AND PERFORMANCE TESTING OF THE VAWT

P. C. KLIMAS /In Midwest Res. Inst. Fifth Bien. Wind Energy Conf. and Workshop (WW5) p 385-396 1981 refs

(Contract DE-AC04-76DP-00789)

Avail: NTIS HC A23/MF A01

The aerodynamics and testing of vertical axis wind turbines are discussed. Experiments designed to both better understand the aerodynamics of a section operating in an unsteady, curvilinear flowfield and achieve some of the desired changes in section properties are discussed. The common goal of all of these experiments is to increase efficiency and system reliability. R.J.F.

N83-15934# Midwest Research Inst., Golden, Colo Solar Energy Research Inst.

TELEVISION INTERFERENCE AND ACOUSTIC EMISSIONS ASSOCIATED WITH THE OPERATION OF THE DARRIEUS VAWT

N. D. KELLEY, R. R. HEMPHILL, and D. L. SENGUPTA (Michigan Univ.) /In its Fifth Bien. Wind Energy Conf. and Workshop (WW5) p 397-410 1981 refs Sponsored in part by the National Research Council of Canada and Hydro-Quebec

(Contract EG-77-C-01-4042)

Avail: NTIS HC A23/MF A01

Field surveys were conducted to assess the community annoyance potential from electromagnetic interference to television reception (TVI) and acoustic emissions associated with the operation of a Darrieus-type, vertical axis wind turbine (VAWT). The type and extent of interference to nearby television reception was evaluated using a 17 meter VAWT. A series of measurements of observed interference levels were made at a number of sites in the turbine vicinity employing the locally available VHF and UHF television signals as sources. A simple theoretical model was developed for analyzing the TVI produced by the Darrieus turbine. Using this model in conjunction with the field measurements, it was found the Darrieus/VAWT produces the same amount of interference on the lower VHF channels as a horizontal axis turbine with a comparably sized blade scattering area, but less on all other channels. R.J.F.

N83-15935# Aeronautical Research Inst. of Sweden, Stockholm.

SOME INNOVATIVE CONCEPTS IN WIND TURBINES OF THE AXIAL-FLOW, CROSS-FLOW, AND COMBINED (DUAL) FLOW TYPES

O. LJUNGSTROEM /In Midwest Res. Inst. Fifth Bien. Wind Energy Conf. and Workshop (WW5) p 415-432 1981 refs

Avail: NTIS HC A23/MF A01

Within the Axial-Flow Turbine (AFT) category, two concepts are described: the Swept-Blade Turbine (SWBT) and the Catenary-Ribbon Blade Turbine (CRBT). Augmentation of turbine mass flow and power output by increasing the effective sweep area (captured streamtube area) of AFT can be achieved by moving the rotor hub. Some concepts and initial exploratory experiments are described. Among concepts within the Cross-Flow Turbine (CFT) category described are: New applications of the LDB-concept (L-blade and Double Blade) to straight bladed CFT-VAWTS (e.g. Musgrove turbine, Giromill), Inclined shaft CFT with single and multiple shafts, Spiral Blade Concept, Fluid Ring Bearing VAWT. Further, some Dual-Flow Turbine concepts (DFT) are discussed. These consist of a large primary turbine (AFT or CFT) catching the wind energy and transferring it directly to a much smaller secondary turbine (or Brake-Turbine, BT) with high rpm, mounted on the primary turbine. Among alternatives discussed are primary AFT and CFT in combination with secondary AFT and CFT. Author

N83-15936# Dayton Univ., Ohio. Research Inst.

AN UPDATE OF THE ELECTROFLUID DYNAMICS WIND DRIVEN GENERATORS

J. E. MINARDI and M. O. LAWSON /In Midwest Res. Inst. Fifth Bien. Wind Energy Conf. and Workshop (WW5) p 433-444 1981 refs

(Contract EG-77-C-01-4042)

Avail: NTIS HC A23/MF A01

The general objective of the overall research program is to conduct research toward the development of Electrofluid Dynamic (EFD) wind driven generators. In such generators, the wind blows through suitably oriented arrays of electrodes; transports charged particles against an electrical potential gradient; and thereby generates electrical power directly without moving parts. This promises a simpler, less expensive system, free of frontal area and velocity limitations of conventional rotating wind energy systems. For the EFD wind driven generator there are no fundamental reasons to restrict the size; therefore, economies of scale can be realized. A theory for the behavior and performance of EFD wind driven generators was developed. The principle remaining problem is the development of energy economic charged droplet production. Author

N83-15937# Reading Univ. (England).

RECENT PROGRESS IN THE DEVELOPMENT OF THE MUSGROVE VERTICAL AXIS WIND TURBINE

P. J. MUSGROVE and I. D. MAYS (Sir Robert McAlpine and Sons Ltd.) /In Midwest Res. Inst. Fifth Bien. Wind Energy Conf. and Workshop (WW5) p 445-456 1981 refs Sponsored in part by U.K. Science Research Council, U.K. DOE and UKAEA

Avail: NTIS HC A23/MF A01

The design of a 25 metre diameter test bed machine is described. It represents a one-quarter scale model of a 100 metre diameter, 4.4 MW rated machine suitable for use in offshore arrays, and the requirement for long life with low maintenance in a marine environment has strongly influenced the design. Economic studies of offshore wind energy systems indicated that the optimum rotor diameter may be well in excess of 100 metres. Vertical axis wind turbines avoid the cyclically varying gravity loads which limit the size of horizontal axis wind turbines, and it is anticipated that subsequent development of the Musgrove wind turbine will extend to units substantially larger than 100 metres diameter. Author

N83-15938# Washington Univ., St. Louis, Mo.

ATMOSPHERIC TESTING OF A TWO BLADED FURL CONTROLLED WIND TURBINE WITH PASSIVE CYCLIC PITCH VARIATION

K. H. HOHENEMSER and A. H. P. SWIFT /In Midwest Res. Inst. Fifth Bien. Wind Energy Conf. and Workshop (WW5) p 457-468 1981 refs

Avail: NTIS HC A23/MF A01

Passive cyclic pitch variation, adopted from rotorcraft technology, was achieved by letting the blade pair freely oscillate about a common pivot with which the blades formed a small prelag angle. This simple two-bladed rotor was found to be capable of rapid yaw rates suitable for rotor speed control by yawing, without imposing vibratory hub moments and without producing appreciable out-of-plane blade excursions. During the first phase of testing in 1980 the 7.6 m diameter rotor was automatically furling when 228 rpm at 10 kW rotor power was exceeded. Unfurling was performed manually. During the second phase of testing begun in March, 1981, fully automatic furl control systems were used which limited rotor speed and torque quite accurately to predetermined values. It was found that passive cyclic pitch variation and the associated rapid wind direction following did not degrade and possibly enhanced aerodynamic efficiency. Author

05 ENERGY CONVERSION

N83-15939# Grumman Aerospace Corp., Bethpage, N.Y. Research Dept.

ECONOMICS OF DAWT WIND ENERGY SYSTEMS

K M FOREMAN /in Midwest Res. Inst. Fifth Bien. Wind Energy Conf. and Workshop (WW5) p 469-486 1981 refs
 Avail: NTIS HC A23/MF A01

The results of a (DAWT) preliminary design investigation to assess the economic viability of its electrical energy generation are presented. Unit costs are estimated for three output ratings and for three different construction approaches. A limited production run of 100 to 500 units is considered for factory-built subassemblies and on-site final assembly and erection. Regional production centers are assumed within about 350 km (217 miles) of installation. Author

N83-15940# AeroVironment, Inc., Pasadena, Calif.

OPTIMIZATION OF THE DYNAMIC INDUCER WIND TURBINE SYSTEM

P. B. S. LISSAMAN, A. D. ZALAY, and B. HIBBS /in Midwest Res. Inst. Fifth Bien. Wind Energy Conf. and Workshop (WW5) p 501-512 1981 refs
 Avail: NTIS HC A23/MF A01

The dynamic inducer, essentially a horizontal axis wind turbine (HAWT) rotor with small vanes at the tips is a promising, advanced technology wind turbine concept. By adding small vanes to the tip of the conventional rotor, significant increases in power can be obtained with the dynamic inducer system. The development of the system is reviewed, including past theoretical and experimental programs. Recent tow tests and wind tunnel tests established the predicted augmentation power. A new optimization program is outlined, based on advanced theory back by extensive wind tunnel testing, aimed at developing an advanced dynamic inducer system for a state-of-the-art high performance, two-bladed rotor system. It is estimated that the dynamic inducer rotor is about 20% more cost-effective than a conventional system. Author

N83-15941# Sydney Univ. (Australia). Dept. of Mechanical Engineering.

EXPERIMENTS WITH A TWIN ROTOR, SINGLE BLADED GYROMILL

J. BLACKLER, A. J. BARRATT, H. NIBBE, and B. W. ROBERTS /in Midwest Res. Inst. Fifth Bien. Wind Energy Conf. and Workshop (WW5) p 513-522 1981 refs Sponsored in part by the Energy Authority of New South Wales
 Avail: NTIS HC A23/MF A01

The concept of a rotary-winged device known as a gyromill is designed. Such a machine is intended to ascend and descend helicopter fashion on its tethers, and yet be capable of generating electricity in a suitable wind. The philosophy of the current design is discussed along with a description of basic construction. The machine consists of twin, eight foot diameter rotors to give an all-up weight of around 70 lb. Preliminary validation of the motor and rotor system was achieved and further experiments are planned. Author

N83-15954# Sandia Labs., Albuquerque, N. Mex.

VERTICAL-AXIS WIND-TURBINE PROGRAM

R. H. BRAASCH 1981 28 p refs Presented at the 5th Bien. Wind Energy Conf. and Workshop, Washington, D. C., 5 Oct. 1981

(Contract DE-AC04-76DP-00789)

(DE82-003531; SAND-81-1804C; CONF-811043-12) Avail: NTIS HC A03/MF A01

The vertical axis wind turbine program is discussed. Progress in aerodynamics research, structural dynamics research, and machine development is reviewed. Laminar flow, boundary layer control, cambered blades, and costs are also discussed. DOE

N83-16114# Ceskoslovenska Akademie Ved, Prague Inst. of Plasma Physics.

ELEVENTH CZECHOSLOVAK SEMINAR ON PLASMA PHYSICS AND TECHNOLOGY

Oct. 1981 167 p refs Seminar held in Zvukov, Czechoslovakia, 7-9 Oct. 1981
 (IPPCZ-244) Avail: NTIS HC A08/MF A01

Various aspects of plasma physics and Tokamak devices are discussed. Emphasis is placed upon plasma heating. Radio frequency heating, magnetohydrodynamic waves, toroidal plasmas, plasma-electromagnetic interaction, and plasma density are among the topics discussed.

R.J.F.

N83-16115# Kurchatov (I. V.) Inst. of Atomic Energy, Moscow (USSR).

TOKAMAK RESEARCH IN THE SOVIET UNION

V. S. STRELKOV /in Ceskoslovenska Akademie Ved. 11th Czechoslovak Seminar on Plasma Phys. and Technol. p 3-13 Oct. 1981 refs
 Avail: NTIS HC A08/MF A01

Experimental research and engineering to provide the basis for fusion reactor design are discussed. Various methods of plasma heating are discussed. Magnetohydrodynamic waves, toroidal fields, radio frequency heating, microwave frequencies, cyclotron radiation, and adiabatic compression are discussed. R.J.F.

N83-16116# Ceskoslovenska Akademie Ved, Prague. Inst. of Plasma Physics.

LOWER-HYBRID HEATING EXPERIMENT ON THE TM-1MH TOKAMAK

J. DATLOV, K. JAKUBKA, V. KOPECKY, S. KOERBEL, L. KRYSKA, P. MAGULA, J. STOECKEL, and F. ZACEK /in its 11th Czechoslovak Seminar on Plasma Phys. and Technol. p 37-40 Oct. 1981 refs
 Avail: NTIS HC A08/MF A01

During preliminary experiments on the plasma heating region in the TM-1MH device high frequency (HF) power up to 100 kW at the frequency of 616 MHz was injected into the Tokamak by means of a loop fed by a coaxial line. The process of HF field-plasma interaction was found strongly nonlinear in the whole 3 to 100 kW power range. It takes place predominantly at the periphery of the plasma column. Electron density increase during the heating process was reduced by working at various temperatures of the liner up to 300 C. R.J.F.

N83-16117# Ceskoslovenska Akademie Ved, Prague. Inst. of Plasma Physics.

POWER SPECTRUM OPTIMIZATION OF THE THREE-WAVEGUIDE GRILL FOR THE T-7 TOKAMAK

J. PREINHAEALTER, Z. SEDLACEK, and S. KOERBEL /in its 11th Czechoslovak Seminar on Plasma Phys and Technol. p 41-46 Oct. 1981 refs
 Avail: NTIS HC A08/MF A01

Phased array of waveguides, named the grill, is usually used as a coupling structure in experiments with the lower hybrid resonance heating of plasma. In this case the grill consists of three elements. In the theoretical model it is assumed that the height of waveguides is infinite (in the y-direction) and the slab geometry is adopted with the x-axis along the toroidal magnetic field. The field in waveguides is assumed to be the sum of transverse magnetic modes (in numerical computations 10 modes were taken), from which only the first mode is propagating and the others are evanescent. It is also supposed that only the slow wave is present in the plasma and that the plasma density profile is linear. R.J.F.

N83-16118# Ceskoslovenska Akademie Ved, Prague. Inst. of Plasma Physics.

SHORT WAVELENGTH LOWER HYBRID WAVES NONLINEARLY EXCITED DUE TO PONDEROMOTIVE DENSITY MODULATION

R. KLIMA, I. M. PANKRATOV, P. PAVLO, and V. A. PETRZILKA *In its* 11th Czechoslovak Seminar on Plasma Phys. and Technol. p 47-51 Oct. 1981 refs

Avail: NTIS HC A08/MF A01

One of several nonlinear mechanisms that can play a role in the lower hybrid heating process is discussed. Nonlinear density modulation due to ponderomotive forces is investigated. In the model, the magnetostatic field $B_{\text{sub } 0}$ is parallel to the x-axis, while the x-axis is parallel to the density (and temperature) gradient. Because of the strong decrease of density modulation with increasing temperature, the nonlinearity is assumed to be negligible inside the plasma at a certain $x = x_{\text{sub } f}$. High frequency field is launched from a waveguide array, separated from the plasma by a thin vacuum region. R.J.F.

N83-16119# State Coll. of Mining and Metallurgy, Ostrava-Poruba (Czechoslovakia). Dept. of Physics.

ELECTRON IMPACT IONIZATION OF HIGHLY CHARGED MOLYBDENUM IMPURITIES IN TOKAMAK PLASMAS

V. STRZONDALA *In* Ceskoslovenska Akademie Ved. 11th Czechoslovak Seminar on Plasma Phys. and Technol. p 52-53 Oct. 1981 refs

Avail: NTIS HC A08/MF A01

Estimations of cross sections of molybdenum ions are discussed. An approximate calculation of the electron impact cross sections of ions is expressed. R.J.F.

N83-16120# Ceskoslovenska Akademie Ved, Prague. Inst. of Plasma Physics.

ANDROMEDA: THE SYSTEM FOR THE ACQUISITION AND NUMERICAL DATA PROCESSING AND ITS APPLICATION FOR EXPERIMENTAL DEVICE TOKAMAK TM-1-MH

L. KRYSKA and S. KOERBEL *In its* 11th Czechoslovak Seminar on Plasma Phys. and Technol. p 54-55 Oct. 1981

Avail: NTIS HC A08/MF A01

The operation of the Tokamak TM-1-MH experimental device demands a system for the registration and numerical processing of analog transient signals from various diagnostic sensors. These signals of relatively short duration (up to 10 ms) have a repetition period of 4 to 5 min approximately. A system, ANDROMEDA, for the registration and digital processing of analog transient signals from various diagnostic sensors in a Tokamak device is discussed. The four basic working regimes of the system ANDROMEDA are as follows: the registration of signals in the electronic buffer memory; the reconstruction of registered informations (the repetition regime); the transfer of collected data into the computer and the numerical processing of these data; and the displaying, plotting and printing of processed data (oscilloscope, plotter, printer). The data acquisition subsystem can be operated independently as an autonomous 16-channel digital-memory oscilloscope. R.J.F.

N83-16121# Ceskoslovenska Akademie Ved, Prague. Inst. of Plasma Physics.

SOFT X-RAY DIAGNOSTICS ON TOKAMAK TM-1-MH

P. MAGULA *In its* 11th Czechoslovak Seminar on Plasma Phys. and Technol. p 56-59 Oct. 1981 refs

Avail: NTIS HC A08/MF A01

Two kinds of soft X-ray detectors (the gas proportional detector and liquid nitrogen cooled Si (Li) detector) are used at the TM-1-MH Tokamak for the measurement of electron temperature $T_{\text{sub } e}$ and for the determination of the influence of high frequency (HF) heating on the electron distribution function in the Tokamak plasma. The heating experiments were made in two ranges of frequencies: 1,25 GHz and 616 MHz. In the first experiment at 1,25 GHz a magnetron was used as a power generator and $T_{\text{sub } e}(0)$ was determined by means of the gas proportional counter with the Be window of 0.0001 m thickness. The soft X-ray spectrum was measured in the 1,5 keV to 5 keV energy range. From the

comparison of the X-ray spectra with and without HF heating respectively, it can be seen the influence of the HF heating starting from 2,7 keV energy which appears in the form of a tail in the distribution function with the temperature $T_{\text{sub } e} = 710 \text{ eV}$. Supposing that the level and composition of impurities do not change during the application of HF impulse it can be appreciated that approximately 1% of electrons are heated, consuming totally 0,5 kW of HF power. The Tcherenkov damping of electrons is supposed to be the absorption mechanism for the HF wave. R.J.F.

N83-16122# Ceskoslovenska Akademie Ved, Prague. Inst. of Plasma Physics.

ENERGY BALANCE IN TM-1-MH TOKAMAK (OHMICAL HEATING)

J. STOECKEL, S. KOERBEL, L. KRYSKA, V. KOPECKY, V. DADALEC, J. DATLOV, K. JAKUBKA, P. MAGULA, F. ZACEK, G. V. PEREVERZEV (Kurchatov Inst. of Atomic Energy) et al. *In its* 11th Czechoslovak Seminar on Plasma Phys. and Technol. p 60-64 Oct. 1981 refs

Avail: NTIS HC A08/MF A01

Plasma in the TM-1-MH Tokamak was experimentally studied in the parameter range: tor. mag. field $B = 1,3 \text{ T}$, plasma current $I_{\text{sub } p} = 14 \text{ kA}$, electron density $N_{\text{sub } E} 3.10$ to the 19th power cubic meters. The two numerical codes are available for the comparison with experimental data. TOKATA-code solves simplified energy balance equations for electron and ion components. TOKSAS-code solves the detailed energy balance of the ion component. R.J.F.

N83-16123# Ceskoslovenska Akademie Ved, Prague. Inst. of Plasma Physics.

COMPUTER SIMULATIONS OF REFLEX E-BEAM SYSTEMS AND PLASMA STABILITY

K. JUNGWIRTH and P. STAVINOHA *In its* 11th Czechoslovak Seminar on Plasma Phys. and Technol. p 77-93 Oct. 1981 refs

Avail: NTIS HC A08/MF A01

A 1 1/2 dimensional PIC simulation model OREBIA was devised for systems with a virtual or reflex cathode to investigate various reflexing electron beam phenomena, dynamics of ions accelerated within the anode-cathode gap, ion beam generation, ion acceleration, evolution of the h.v. diode impedance and its matching to the external circuit, and further related phenomena. Schematics of the coupled to an external electric circuit model OREBIA-REX as well as of its central module OREBIA are illustrated. This model based on analytical estimates and set up in close correlation to experimental work was described in detail in the report. Following to its up to date version, electrons emitted from the (moving) surface of the cathode plasma and accelerated within the anode-cathode gap are scattered elastically and lose simultaneously some part of their energy at the (moving) boundaries of the anode (either externally or gas produced) plasma according to a foil-scattering model. B.W.

N83-16124# Institute of Nuclear Research, Swierk (Poland).

FUSION AT COUNTERSTREAMING ION BEAMS: IONS OPTIC FUSION (IOF)

M. GRZYNSKI *In* Ceskoslovenska Akademie Ved. 11th Czechoslovak Seminar on Plasma Phys. and Technol. p 94-100 Oct. 1981 refs

Avail: NTIS HC A08/MF A01

Different concepts of a controlled fusion energy release were developed during over one quarter century lasting investigations. Those were mostly based on the concept of magnetic confinement of thermalized plasma. In the last decade research on fusion energy production in inertially confined thermal plasma were strongly developed. A brief review of research on the fusion energy production at highly ordered motion of ions in counterstreaming ion beams is given. Author

05 ENERGY CONVERSION

N83-16125# Technical Univ. of Zamek (Czechoslovakia). Electrotechnical Faculty.

DEVELOPMENT OF CURRENT SHEAT ON OUTPUT OF COAXIAL GUN

J. KRAVARIK, P. KUBES, and J. HRUSKA *In Ceskoslovenska Akademie Ved* 11th Czechoslovak Seminar on Plasma Phys. and Technol. p 101-102 Oct. 1981

Avail: NTIS HC A08/MF A01

The investigation of current sheat collapse has been directed to the maximum gain of plasma density, plasma temperature and neutron production. The evolution of collapse is dealt with in this paper

Author

N83-16126# Purkyne (J. E.) Univ., Kotlarska (Czechoslovakia). Dept. of Physical Electronics.

COATING OF LASER FUSION TARGETS BY PLASMA POLYMERIZED ORGANIC THIN FILMS

J. JANOVA *In Ceskoslovenska Akademie Ved* 11th Czechoslovak Seminar on Plasma Phys. and Technol. p 103-104 Oct. 1981

Avail: NTIS HC A08/MF A01

The laser fusion targets are the deuterium - tritium filled spherical glass shells of the order of 100 - 200 micrometers in diameter and coated with 5 to 30 micrometers of density - matching, low atomic number material. The coating material must be of uniform density having the surface imperfections less than 5×0.01 micrometers. The filled glass shells cannot be heated above 200 C since the permeation rate of the DT of the shell may increase rapidly. Among evaluated methods available for depositing thin layers of this type, the plasma polymerization was found to be the best approach. In the literature described experiments have shown that the plasma polymerized fluorocarbons produce coatings having the densities from 1.8 to 2.4 g/cu cm.

Author

N83-16127# Academy of Sciences, Berlin (East Germany). Zentralinst. fuer Elektronenphysik

NUMERICAL SIMULATION OF COLLECTIVE ION ACCELERATION

W. HINTZE *In Ceskoslovenska Akademie Ved* 11th Czechoslovak Seminar on Plasma Phys. and Technol. p 105-106 Oct. 1981 refs

Avail: NTIS HC A08/MF A01

A one dimensional particle simulation code was developed in order to study collective ion acceleration during injection of an IREB into initially neutral gas. Two different cases were treated: homogenous gas filling of the drift space, and gas cloud near the injection plane. Injection into a sharply localized ion source at the anode has been studied earlier. Contrary to our code, the diode region was included in the calculation. Details of our code are described. Electrons are injected with constant energy but with finite current risetime into a grounded drift space of length L which is filled with a gas from $x = 0$ to $x = D$ (approx. L). The gas is ionized by electron impact with a constant ionization frequency. The code was run for various combinations of the parameters. The main objective of the study was to assess the capability of a strictly one dimensional model.

B W

N83-16128# Technical Univ. of Prague (Czechoslovakia).

ION VELOCITY MEASUREMENTS FOR LASER MASS ABLATION STUDIES

L. PINA *In Ceskoslovenska Akademie Ved* 11th Czechoslovak Seminar on Plasma Phys. and Technol. p 107-108 Oct. 1981

Avail: NTIS HC A08/MF A01

The measurements used 10 J, 1.7 ns (FWHM), 1.06 micrometers laser pulse to irradiate flat Al targets. A range of lenses with focal lengths from 75 mm to 2000 mm were used to focus 50 mm diameter beam on target, resulting in a range of optical spot diameters from 30 micrometers to 3.5 mm. Irradiance on target was varied by inserting calibrated glass Nd filters in the main beam. Ion velocities were recorded using six time-of-flight Faraday cup collectors arrayed in the horizontal plane from 10 deg to 80 deg to the target normal at distances approx 40 cm from the plasma. The focal spot size was measured by imaging the focal plane distribution onto infrared film. Ion velocities were calculated

from the arrival time of the peak ion current. Polar ion velocity plots were extrapolated to determine the ion velocity normal to the target surface. These normal velocities were then plotted against irradiance I for each spot size. Random shots onto plastic targets showed no significant difference in measured velocities

B.W.

N83-16129# Academy of Sciences, Berlin (East Germany). Zentralinst. fuer Elektronenphysik.

CRATER FORMATION BY HIGH CURRENT DISCHARGES IN VACUUM

P. SIEMROTH and B. JUETTNER *In Ceskoslovenska Akademie Ved* 11th Czechoslovak Seminar on Plasma Phys. and Technol. p 109-111 Oct. 1981 refs

Avail: NTIS HC A08/MF A01

Metal vapor arcs between cold electrodes in an ambient vacuum (so-called vacuum arcs) are characterized by small hot spots that rapidly and stochastically move over the surface. These cathode spots are characterized by a very high current density, high temperature and plasma density. Typical erosion marks - the craters - are left behind by the spots. Craters are assumed to play an important role for the current transfer from the cathode to the discharge plasma. Furthermore, they reflect the effort of producing the plasma itself. Therefore, the crater formation describes the essential process of the discharge. Low current experiments were carried out.

B.W.

N83-16130# Ceskoslovenska Akademie Ved, Prague. Inst. of Plasma Physics.

SOFT X-RAY AND VUV EMISSION FROM REB-HEATED PLASMA IN REBEX 1 AND REBEX 1 MACHINES

V. PIFFL and V. RAUS *In its* 11th Czechoslovak Seminar on Plasma Phys. and Technol. p 112-113 Oct. 1981

Avail: NTIS HC A08/MF A01

The measurements of soft X-ray spectra in REB-heated plasma experiments by means of a conventional scintillation technique is difficult due to the intense bremsstrahlung originating from interaction of beam electrons with a plasma and chamber walls. In the experiments with the REBEX 1 machine, predominantly radiation from a decaying plasma long after the beam injections pulse ($t = 0.5$ micro sec.) could be measured in this way, although very thin plastic scintillators were used. The absorption characteristics of X-ray emission from a plasma are measured and compared with calculated Maxwellian plasma emission for several temperatures. To detect ultrasoft X-ray and VUV emission two types of photoemission detectors were developed

Author

N83-16131# Ceskoslovenska Akademie Ved, Prague. Inst. of Plasma Physics.

DYNAMICAL MODEL OF AN OVERHEATED MAGNETIZED PLASMA

K. JUNGWIRTH and J. ULLSCHMIED *In its* 11th Czechoslovak Seminar on Plasma Phys. and Technol. p 114-115 Oct. 1981 refs

Avail: NTIS HC A08/MF A01

In experiments on plasma heating by REB on the REBEX machine diamagnetic measurements represent a basic method for evaluation of the plasma energy content and of the efficiency of REB-to-plasma energy transfer. Variety of forms of the observed diamagnetic signals implies a complicated nature of the energy transfer processes. To interpret correctly the diamagnetic data a simple but fairly general model describing the heated plasma dynamics was developed.

Author

N83-16132# Academy of Sciences, Berlin (East Germany). Zentralinst. fuer Elektronenphysik.

DYNAMICS OF IONIZATION AND TRANSPORT IN A MAGNETICALLY CONFINED PLASMA COLUMN

H. PRINZLER and P. HEYMANN /In Ceskoslovenska Akademie Ved. 11th Czechoslovak Seminar on Plasma Phys and Technol p 118-125 Oct. 1981 refs

Avail. NTIS HC A08/MF A01

Transport processes in magnetized low temperature plasmas have been investigated during the past two decades up to the present. They are stimulated by the dominant role of anomalous transport in fusion devices, where the concept of wave induced perpendicular losses gives a promising model for physical explanation. A disturbance of the plasma equilibrium distributed nearly homogeneous along the plasma column is used. The propagating density perturbation in radial direction is observed. It was found that the perturbation propagates in an anomalous way with enhanced perpendicular transport, caused by a discrete spectrum of correlated drift-like modes. From the field equations for electrons and ions a rectangular slab model introduced by Aldridge and Keen has been derived which gives the dispersion of dissipative drift wave modes (Ellis, et al., 1980) B.W.

N83-16133# Institute of Physics and Technology of Radiation Devices, Bucharest (Romania).

A TIME RESOLVING METHOD FOR DETERMINING THE ENERGY SPECTRUM OF NEUTRONS EMITTED BY A PLASMA FOCUS DEVICE

I. I. POPESCU and M. VLAD /In Ceskoslovenska Akademie Ved 11th Czechoslovak Seminar on Plasma Phys. and Technol p 126-127 Oct. 1981 refs

Avail. NTIS HC A08/MF A01

A method to obtain the time evolution of the energy spectrum $f(v,t)$ of the neutrons emitted by a deuterium plasma produced in a plasma focus device is proposed. The neutrons do not interact with the magnetic and electric fields and have negligible interaction with discharge vessel walls, the knowledge of their energy spectrum provides very accurate information on the neutron production mechanism present in the plasma focus. Neutron measurements determine the time averaged energy spectrum only. Such measurements are made by the time of flight method, and by recording the proton recoils in nuclear emulsions. The two methods, used on the same discharge give different results which indicates the existence of a time dependence in the neutron energy spectrum E.A.K.

N83-16134# Ceskoslovenska Akademie Ved, Prague Inst of Plasma Physics.

APPARATUS FOR PLASMA ELECTRON TEMPERATURE AND DENSITY MEASUREMENTS BY THOMSON SCATTERING

K. KOLACEK and V. BABICKY /In its 11th Czechoslovak Seminar on Plasma Phys and Technol. p 128-129 Oct. 1981 refs

Avail. NTIS HC A08/MF A01

The Thomson scattering technique is based on fact, the monochromatic radiation passing a plasma is under certain circumstances dominantly scattered by freely moving electrons which causes its frequency to broaden by Doppler effect. A wavelength analysis of the scattered light yields an information on the electron motion and hence on the electron temperature, while the total power of the scattered light is proportional to the number of scattering centers and hence to the electron density. Since the Thomson scattering cross section is small, an application of this technique was not possible only by giant pulse lasers with well collimated beams. Thomson scattering apparatus consists of the following parts: the laser, the interaction chamber and the detection system. The detection part enables the measurement of the scattered light spectrum in six spectral channels during one laser shot. By changing the dispersing element of the polychromator it is possible to change the dispersion range. E.A.K.

N83-16135# College of Mechanical and Electrical Engineering, Plzen (Czechoslovakia). Dept. of Physics

DIAGNOSTICS OF NONEQUILIBRIUM HYDROGEN PLASMA

J. FERDINAND /In Ceskoslovenska Akademie Ved. 11th Czechoslovak Seminar on Plasma Phys. and Technol. p 130-134 Oct. 1981 refs

Avail. NTIS HC A08/MF A01

Electron temperature measurements in low electron density plasma are discussed. Special plasma models are required in diagnostics of nonequilibrium plasma. Coronal and collisional radiative models are used. In low electron density regions the results obtained by both models are nearly equal. Both models allow to use for electron temperature measurements the method of ratio of intensities of two spectral lines. Hydrogen glow discharge is verified. E.A.K.

N83-16136# Research Inst of Electrical Apparatus, Brno (Czechoslovakia)

EQUIDENSITOMETRIC EVALUATION OF A FILM RECORD OF AN SF6 SWITCHING ARC

B. SVEJDA and B. GROSS (Technical Univ., Brno, Czechoslovakia) /In Ceskoslovenska Akademie Ved. 11th Czechoslovak Seminar on Plasma Phys. and Technol p 135-138 Oct. 1981 refs

Avail. NTIS HC A08/MF A01

An electric switching arc in a nozzle of an SF sub 6 circuit breaker was photographed by a high speed camera. The SF sub 6 circuit breaker used for the experiment was specially modified for physical measurements. These conditions allow an optical reach of the inside nozzle space and observation of the whole opening operation. The instantaneous position of the electrodes is recorded exactly and a special adaptation of the high speed camera allows it to obtain an unambiguous correlation between electrical parameters of the observed switching arc and the respective photorecord of the arc. E.A.K.

N83-16137# Ceskoslovenska Akademie Ved, Prague Inst. of Plasma Physics

GLOBAL MODEL OF A HYBRID TOKAMAK REACTOR WITH AN AUXILIARY RF HEATING

L. KRLIN, P. PAVLO, and Z. TLUCHOR /In its 11th Czechoslovak Seminar on Plasma Phys. and Technol. p 143-152 Oct. 1981 refs

Avail. NTIS HC A08/MF A01

Estimates of basic parameters of a model of the hybrid Tokamak reactor are presented. For an auxiliary plasma heating, the absorption of lower hybrid waves is considered. The typical reactor parameters, the outgoing power, the power obtained by the deposition of the energy of alpha particles, the RF power absorbed in the plasma, the driven current coupled with the RF absorption and the production rate of the plutonium are estimated. E.A.K.

N83-16138# Ceskoslovenska Akademie Ved, Prague. Inst. of Plasma Physics.

SIMULATION CODE OF RELATIVISTIC ELECTRON BEAM DIODES

P. VRBA /In its 11th Czechoslovak Seminar on Plasma Phys and Technol. p 153-156 Oct. 1981 refs

Avail. NTIS HC A08/MF A01

The opposing relativistic electron and ion flows in own or applied electric and magnetic fields inside the cylindrical diode were numerically analyzed. A finite size particle quasistatic computer model is developed via self consistent solution by differential equations. The behavior of relativistic electron and ion flux in self consistent electric and magnetic fields near the maximum of voltage pulse is determined. E.A.K.

05 ENERGY CONVERSION

N83-16139# College of Mechanical and Electrical Engineering, Plzen (Czechoslovakia). Dept. of Physics.
HELIUM POPULATION MODEL

J. SLAVIK *In* Ceskoslovenska Akademie Ved. 11th Czechoslovak Seminar on Plasma Phys. and Technol. p 157-159 Oct. 1981
Avail: NTIS HC A08/MF A01

The radiation - scattering models of plasma were numerically analyzed. The construction of such a model for helium plasma which enables study of metastable state effects and their relatively many atomic data are discussed. E.A.K.

N83-16140# Ceskoslovenska Akademie Ved, Prague Inst. of Plasma Physics.

NUMERICAL SIMULATION OF THE INTERACTION OF AN ELECTROMAGNETIC WAVE WITH AN INHOMOGENEOUS PLASMA

J. LACINA and J. PREINHAELTER *In its* 11th Czechoslovak Seminar on Plasma Phys. and Technol. p 160-162 Oct. 1981 refs

Avail: NTIS HC A08/MF A01

Heating by high frequency waves was studied. A numerical code which enables the study of incidence of an electromagnetic wave on an inhomogeneous plasma was developed. The one dimensional model which are nonmagnetized plasma of the two fluid equations with a finite electron pressure and with the adiabatic condition for all processes is described. It is stipulated that in the initial moment the plasma builds up a slab with a symmetrical profile for both the density and the electron temperature. The equilibrium is attained by the presence of the symmetrical gravitational field. The incident wave on the plasma boundary fulfills the nonreflecting boundary conditions. The problem is solved by finite difference method. The results of the computation agree with the quasilinear theory of the ponderomotive forces. E.A.K.

N83-16143# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

PHYSICS (SELECTED ARTICLES)

Z. SHIYAO, C. ZESHENG, X. XIAOLUNG, and H. QIANG 10 Sep. 1982 25 p refs Transl. into ENGLISH from Wuli (China), v. 10, no. 8, Aug. 1981 p 488-490
(AD-A119830; FTD-ID(RS)T-0802-82) Avail: NTIS HC A02/MF A01 CSCL 20H

Controlled nuclear fusion as a new energy source was investigated. It will be possible in the 1980's to obtain thermal nuclear ignition, and in the early 2000's nuclear fusion may be used to supplement the energy shortage. It is predicted that in the 2000's nuclear fusion will occupy an important position as a global source of energy E.A.K.

N83-16211# Electrotechnical Lab., Ibaraki (Japan).

MASS BALANCE ON THE ARC MODE SEED ELECTRODES

S. KORENAGA, H. IMAI, and T. MASUDA Sep. 1982 36 p refs Backup document for AIAA Synoptic scheduled for publication in the Journal of Energy, Jul.-Aug. or Sep.-Oct., 1983
Avail: NTIS HC A03/MF A01

The mass transfer of seed material caused by arcing of condensed seed materials in MHD channels was investigated. Experiments were conducted in an electric furnace at atmospheric pressure and 1,250 C; K₂SO₄ was used as the seed material. Mass balance models are proposed, and the equations which indicate the relationship between the evaporation rates and arc current are derived. These equations are compared with experimental results. At the cathode, the calculated values agree well with the measured values. At the anode, good agreement is not obtained, because only a part of potassium metal generated on the surface of electrode evaporates into the atmosphere.

M.G.

N83-16214# JAYCOR, Alexandria, Va.

PERFORM EXPERIMENTS ON LINUS-O AND LTX IMPLoding LIQUID LINER FUSION SYSTEMS Final Report, 8 Sep. 1980 - 30 Sep. 1981

E. P. SCANNELL 27 Aug. 1982 26 p refs

(Contract N000173-80-C-0463)

(AD-A120052; J206-82-012/6203) Avail: NTIS HC A03/MF A01 CSCL 20I

The Plasma Physics Division of the Naval Research Laboratory (NRL) has been conducting investigations of imploding liquid liner fusion systems for several years (Reference 1). This effort attained a significant milestone in 1978 with the construction of two machines: HELIUS and LINUS-O is a 60 MJ rotor system where a cylindrical liquid sodium - potassium (NaK) metal liner is radially compressed from a 30 cm to 1 cm diameter by gas pressure from multiple high explosive charges. These charges act on an annular piston in contact with the liquid NaK liner material. HELIUS is a half-scale vertical axis version of LINUS-O using high pressure helium to drive the annular piston. HELIUS is designed to be a test bed for new concepts and to permit testing of new modifications to LINUS-O. The principal virtue of HELIUS is its capability for ten to twenty shots per day as compared to two or three shots per day for LINUS-O. In addition, HELIUS is designed to provide higher drive pressures than were previously obtainable with water models for liner hydrodynamic studies and a magnetic flux compression capability up to approx. 100 kG. GRA

N83-16217# Princeton Univ., N. J. Plasma Physics Lab.

HIGH-N COLLISIONLESS BALLOONING MODES IN AXISYMMETRIC TOROIDAL PLASMAS

C. Z. CHENG 1981 39 p refs

(Contract DE-AC02-76CH-03073)

(DE82-002831; PPPL-1841) Avail: NTIS HC A03/MF A01

A collisionless kinetic ballooning mode equation, which includes the full ion finite Larmor radius (FLR), the magnetic drift, and the trapped electron effects is derived and investigated for a large aspect ratio circular flux surface equilibrium in the frequency regime, 0 mega/sub bi/, 0 mega/sub ti/ less than 0 mega less than 0 mega/sub be/, 0 mega/sub te/. The finite Larmor radius effects can reduce the growth rate, but do not stabilize the ballooning modes due to the destabilizing influence of the ion magnetic drift resonance. It is, in general, incorrect to simulate the FLR effects by employing the often used FLR modified model. The trapped electrons have a stabilizing effect due to the reduction of the destabilizing circulating electron parallel current perturbation. For typical Tokamak aspect ratio, the critical beta can be improved by 40%. DOE

N83-16218# Los Alamos Scientific Lab., N. Mex.

ELMO BUMPY TORUS FUSION-REACTOR DESIGN STUDY

R. A. KRAKOWSKI and D. DEFREECE 1981 6 p refs Presented at the 9th Symp. on Eng. Probl. of Fusion Res., Chicago, Ill., 26 Oct. 1981

(Contract W-7405-ENG-36)

(DE82-002388; LA-UR-81-3144; CONF-811040-50) Avail: NTIS HC A02/MF A01

A complete power plant design of a 1200-MWe ELMO Bumpy Torus Reactor (EBTR) is described. Those features that are unique to the EBT confinement concept are emphasized, with subsystems and balance-of-plant items that are generic to magnetic fusion being adopted from past, more extensive Tokamak reactor designs. This overview paper stresses the design philosophy and assumptions that led to an economic, 35-m major-radius design that at 1.4 MW/sq meter wall loading generates 4000 MWt with a 15% recirculating power fraction. DOE

05 ENERGY CONVERSION

N83-16220# Los Alamos Scientific Lab., N. Mex.
HELIOS MOVABLE HARTMANN BALL
 H. E. TUCKER, R. D. DAY, R. O. HEDGES, J. A. HANLON, and
 B. L. KORTEGAARD 1981 4 p Presented at the 7th Conf.
 on Appl. Mech., Kansas City, Mo., 7 Dec. 1981
 (Contract W-7405-ENG-36)
 (DE82-000756; LA-UR-81-2874; CONF-811209-1) Avail: NTIS
 HC A02/MF A01

The Helios movable Hartmann ball is described in its function to precisely align the laser and target area. It provides the laser fusion facility with additional target illumination flexibility so that many additional parameters can be investigated in the realm of target implosion physics. DOE

N83-16222# Princeton Univ., N. J. Plasma Physics Lab.
EFFECT OF LOW-FREQUENCY DENSITY FLUCTUATIONS ON ION-CYCLOTRON WAVES

M. ONO Oct. 1981 34 p refs
 (Contract DE-AC02-76CH-03073)
 (DE82-002829; PPPL-1836) Avail: NTIS HC A03/MF A01

Scattering of waves in the ion cyclotron range of frequencies by low-frequency fluctuations is analyzed in the weak turbulence approximation. Finite-ion-Larmor radius, multi-ion-species, ion-drift-motion, and electromagnetic terms are included in the wave kinetic equation. Conditions for significant scattering have been identified for the fast wave as well as for externally launched ion Bernstein waves. Implications for ICRF heating in Tokamak plasmas are discussed. DOE

N83-16226# Association Euratom-CEA, Fontenay-aux-Roses (France).

STUDY OF THE IONIC DISTRIBUTION AND OF THE ENERGY DEPOSITION IN A PLASMA OF TOKAMAK HEATED BY INJECTION OF FAST NEUTRALS Ph.D. Thesis - Paris-Sud Univ.

B. GAGEY Mar. 1981 162 p refs In FRENCH; ENGLISH summary
 (EUR-CEA-FC-1094) Avail: NTIS (US Sales Only) HC A08/MF A01; DOE Depository Libraries

In the Tokamak TFR 600 fast neutrals injection is done almost perpendicular to the magnetic field so it is expected theoretically that perpendicular injection would be more susceptible to drive microinstabilities. Assuming the energy slowing-down is classical, a Monte-Carlo code was modified to calculate self-consistently the behavior of the fast ions in the real plasma and the real magnetic configuration. The code allows to obtain the energy deposition profiles and the fast ions distribution function at a given moment of the injection. Absolutely calibrated electrostatic analyzers measured the fast ions which are lost by charge exchange versus toroidal and poloidal angles in different experimental conditions. The measurements are in good agreement with the code. Plasma evolution during injection was studied by assuming the calculated energy deposition profiles. The Monte-Carlo code was coupled with a one dimensional plasma simulation code which treats the evolution of the densities, temperatures and ohmic current, without any additional heating. DOE

N83-16227# Los Alamos Scientific Lab., N. Mex.
ION KINETIC EFFECTS ON THE TILT MODE IN FRCS
 J. L. SCHWARZMEIER, C. E. SEYLER (Cornell Univ., Ithaca, N.Y.), and D. C. BARNES (Texas Univ., Austin) 1981 5 p refs
 Presented at the 4th Symp. on the Phys. and Technol. of Compact Toroids, Livermore, Calif., 27-30 Oct. 1981
 (Contract W-7405-ENG-36)
 (DE82-002329; LA-UR-81-3159; CONF-811087-5) Avail: NTIS
 HC A02/MF A01

Theory and simulations show that field reversed configurations (FRG's) should be unstable magnetohydrodynamically to the tilting mode, yet tilting seldom is seen in the experiments. Profile effects (within MHD) and ion finite larmor radius effects are proposed to explain the observed stability of FRC's. DOE

N83-16228# California Univ., Livermore. Lawrence Livermore Lab.

THE MFTF-B PLASMA DIAGNOSTIC SYSTEM

A. L. THROOP, D. A. GOERZ, and S. R. THOMAS 21 Oct. 1981 7 p refs Presented at 9th Symp. on Engr. Probl. of Fusion Res., Chicago, 26 Oct. 1981 Submitted for publication (Contract W-7405-ENG-48)
 (DE82-002594; UCRL-86124; CONF-811040-58) Avail: NTIS
 HC A02/MF A01

The plasma diagnostic system for MFTF-B is described. The system requirement changes which have occurred as a result of the funded rescoping of the original MFTF facility into MFTF-B are discussed. The diagnostic instruments which are planned are outlined and an overview of the diagnostic system is presented. DOE

N83-16229# Texas Univ., Austin Inst. for Fusion Studies.
STABILIZATION OF AXISYMMETRIC MIRROR PLASMA BY ENERGETIC ION INJECTIONS

F. L. HINTON and M. N. ROSENBLUTH Oct. 1981 37 p refs
 (Contract DE-FG05-80ET-53088)
 (DE81-030341; DOE/ET-53088/42) Avail: NTIS HC A03/MF A01

Plasmas in axisymmetric mirror devices can be made stable to MHD interchange modes by injecting energetic ions which contribute significantly to the pressure and spend a sufficiently large fraction of a bounce time in regions of favorable curvature. Pitch angle scattering adversely affects the method by reducing this fraction. The ions must be sufficiently energetic that pitch-angle scattering is not detrimental for that part of a slowing-down time during which they contribute significantly to the pressure. We have solved the bounce-averaged Fokker-Planck equation, including drag and pitch-angle scattering, and calculated the energetic ion contribution to the stability integral. With specially tailored magnetic fields, the required injection energy and power draining are found to be reasonable. DOE

N83-16230# Oak Ridge National Lab., Tenn.
AUTHORS GUIDE TO PUBLISHING IN THE FIELDS OF PLASMA PHYSICS AND CONTROLLED FUSION

Oct. 1981 29 p Presented at the 23rd Ann. Meeting of the Div. of Plasma Phys. of the APS, New York, 12 Oct. 1981
 (Contract W-7405-ENG-26)

(DE82-002866; CONF-811028-7) Avail: NTIS HC A03/MF A01
 The purview, audience, and special restrictions are listed for 27 journals in the international literature that publish articles on plasma physics and controlled fusion. A.R.H.

N83-16231# General Atomic Co., San Diego, Calif.
PROSPECTS OF LOW-ACTIVATION FUSION-REACTOR DESIGN

G. R. HOPKINS, E. T. CHENG, I. MAYA, C. P. C. WONG, and K. R. SCHULTZ Oct. 1981 7 p refs Presented at 9th Symp. on Engr. Probl. of Fusion Res., Chicago, 26-29 Oct. 1981 Submitted for publication
 (Contract DE-AT03-76ET-51011)
 (DE82-003198; GA-A-16552; CONF-811040-88) Avail: NTIS HC A02/MF A01

A design study was performed to investigate the implications of using low activation materials in a fusion power reactor. Using the STARFIRE reactor as a model, low activation design concepts were studied for the four major regions of a fusion reactor: first wall and limiter, blanket, shield, and magnet windings. The first wall and limiter are made of water-cooled aluminum. The blanket uses an unpressurized silicon carbide structure containing Li₂O breeding material with high temperature, high pressure helium coolant contained in SiC thimble tubes. The shield is made of SiC and B₄C with an aluminum structure. The superconducting magnets use an aluminum stabilizer and aluminum or carbon fiber epoxy composite for the structure and dewar. DOE

05 ENERGY CONVERSION

N83-16232# Oak Ridge National Lab, Tenn ENGINEERING FEATURES OF THE INTOR CONCEPTUAL DESIGN

T. E. SHANNON 1981 4 p refs Presented at the 9th Symp. on Eng. Probl. of Fusion Res., Chicago, 26 Oct. 1981

(Contract W-7405-ENG-26)

(DE82-002808; CONF-811040-90) Avail: NTIS HC A02/MF A01

The INTOR engineering design has been strongly influenced by considerations for assembly and maintenance. A maintenance philosophy was established at the outset of the conceptual design to insure that the Tokamak configuration would be developed to accommodate maintenance requirements. The main features of the INTOR design are summarized in this paper with primary emphasis on the impact of maintenance considerations. DOE

N83-16233# Oak Ridge National Lab, Tenn. CAMAC BASED INTER-COMPUTER COMMUNICATIONS SYSTEM

D. E. GREENWOOD and R. D. BURRIS 1981 3 p refs Presented at the 9th Symp. on Eng. Probl. of Fusion Res., Chicago, 26 Oct. 1981

(Contract W-7405-ENG-26)

(DE82-002879; CONF-811040-93) Avail: NTIS HC A02/MF A01

To provide communications between dissimilar computers for the ELMO Bumpy Torus (EBT) experiment CAMAC hardware was used. The software supports file and individual message transfers. The system has proven to be both reliable and fast, with transmission rates of about 36,000 baud. DOE

N83-16259# Los Alamos Scientific Lab., N. Mex. APPLICATION OF FUEL CELLS TO HIGHWAY AND NONHIGHWAY TRANSPORTATION

J. R. HUFF, J. B. MCCORMICH, D. K. LYNN, R. E. BOBBETT, G. R. DOOLEY, C. R. DEROUIN, H. S. MURRAY, and S. SRINIVASAN 1981 11 p refs Presented at the IGT Fuel Cells Technol. Status and Applications Conf., Chicago, 16-18 Nov 1981

(Contract W-7405-ENG-36)

(DE82-004365; LA-UR-81-3424; CONF-811148-1) Avail: NTIS HC A02/MF A01

Fuel cells are a promising alternate power source for transportation applications. Modeling studies have indicated the potential for providing highway vehicles with performance and range comparable to those provided by internal combustion engines. Fuel cells are efficient and therefore reduce energy consumption. They are nonpolluting in terms of both air and noise pollution - highly desirable features for urban applications. In addition, they can operate on nonpetroleum fuels such as hydrogen or hydrogen in combined form, for example, methanol or ammonia, thereby reducing the nation's petroleum dependency. The feasibility of using fuel cells in nonhighway transportation, i.e., rail and marine was also investigated. DOE

06

ENERGY TRANSPORT, TRANSMISSION, AND DISTRIBUTION

Includes transport of fuels by pipelines, tubes, etc., microwave power transmission, and superconducting power transmission

A83-11283 CURRENT TOPICS OF SPS REALIZATION FROM A EUROPEAN VIEWPOINT

W. WESTPHAL (Telefunken AG, Wedel, West Germany) In Space: Mankind's fourth environment, International Astronautical Congress, 32nd, Rome, Italy, September 1981, Selected Papers Oxford, Pergamon Press, 1982, p. 307-318.

European development of a solar power satellite system (SPS) as an aid to successful transition between dwindling fossil fuels

and new, renewable energy sources expected in the 20th century is recommended, together with necessary research, technology, and siting requirements to achieve workable systems. Fossil fuel supplies are expected to be unavailable before fusion and renewable energy sources are able to compensate for the shortfall in the European energy supply. The construction of off-shore polders for rectennas is shown to provide the area which is not available on the European land mass. The \$5 billion projected cost of one rectenna, combined with the reference SPS design, yields a COE of 1.4-1.8 cents/kWh delivered. Necessary technology advancements in the areas of the beam, solar cells, mass production and modularity of SPS components, and thermal sensitivity are reviewed. M.S.K.

A83-11515

THE EFFECT OF THE PARAMETERS OF METAL-FIBER CAPILLARY STRUCTURES ON THE MAXIMUM HEAT-TRANSFER CAPABILITY OF THERMAL PIPES [VLIANIE PARAMETROV METALLOVOLOKNISTYKH KAPILLIARNYKH STRUKTUR NA MAKSIMAL'NUIU TEPLOPEREDAIUSHCHIUU SPOSOBNOST' TEPLOVYKH TRUB]

M. G. SEMENOV and A. N. GERSHUNI (Kievskii Politekhnikeskii Institut, Kiev, Ukrainian SSR) Inzhenerno-Fizicheskii Zhurnal, vol. 43, Oct. 1982, p. 604-609. In Russian.

Previous studies are used in analyzing the influence of structural and geometrical characteristics of metal-fiber structures on the heat-transfer capability. For various orientations in a gravitational field, recommendations are made for determining the characteristics of capillary structure that will ensure a maximum heat-transfer ability for given design parameters dealing with the casing, operating temperature, and heat carrier. C.R.

A83-11525#

ABSORPTION REFRIGERATION MACHINES

C. KEIZER Delft, Technische Hogeschool, Doctor in de Technische Wetenschappen Dissertation, 1982 224 p. refs

Theoretical aspects and experimental results are presented for improving absorption refrigeration machines using water-NH₃ as the working fluid and powered by solar or waste heat. Efforts were made to define optimized working conditions, with consideration given to both the internal and external efficiencies of the absorber. Vertical tubular bubble absorbers were chosen as the system offering the best efficiencies in terms of heat and mass transfer. The refrigerant and the solution are introduced at the bottom of a 25 mm diam vertical tube, producing a two-phase gas-liquid flow. A computer simulation was developed to account for the amount of water in the refrigerant, the efficiency of the heat exchange in the thermal compressor, and the internal and external efficiencies of the absorber, especially in marginal working conditions. A test model was built to establish rules for the design of bubble absorbers. A complete system was run for two years, finding discrepancies between the model to the performance to lie only with the evaporator. Steady state operation was satisfactory, with performance exceeding that of a film absorber system by a factor of two or more. M.S.K.

A83-16089

FIELD IONIZATION OF DEEP LEVELS IN SEMICONDUCTORS WITH APPLICATIONS TO HG/1-X/CD/X/ TE P-N JUNCTIONS

W. W. ANDERSON and H. J. HOFFMAN (Lockheed Research Laboratories, Palo Alto, CA) Journal of Applied Physics, vol. 53, Dec 1982, p. 9130-9145. Research supported by the Lockheed Independent Research Funds. refs

A83-16093* National Bureau of Standards, Washington, D.C. USE OF THERMOCAPILLARY MIGRATION IN A CONTROLLABLE HEAT VALVE

L. A. SCHMID (National Bureau of Standards, Thermophysics Div., Washington, DC) Journal of Applied Physics, vol. 53, Dec 1982, p. 9204-9207. NASA-supported research. refs

In accordance with the Marangoni effect, immiscible droplets in a host fluid in which a temperature gradient exists move in the direction of increasing temperature. It is proposed that this

06 ENERGY TRANSPORT, TRANSMISSION, AND DISTRIBUTION

thermocapillary migration could be used to construct a 'liquid wick' that would return the condensed vapor at the condenser end of a heat pipe back to the evaporator, thus completing the fluid circuit. The droplets would be formed by capillary pressure forcing the condensate through a perforated diaphragm whose temperature would control the droplet flux, and hence the heat flux between the two ends of the heat pipe, thus making it a controllable heat valve. (Author)

A83-16647#

FULLY CONTROLLABLE HEAT PIPE CONTAINING A SHORT ELECTRO-OSMOTIC PUMPING SECTION

A. A. M. DELIL (Nationaal Lucht- en Ruimtevaartlaboratorium, Amsterdam, Netherlands) American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 21st, Reno, NV, Jan. 10-13, 1983, 12 p Research supported by the Nederlands Instituut voor Vliegtuigontwikkeling en Ruimtevaart. refs (AIAA PAPER 83-0317)

It is pointed out that an electro-osmotic heat pipe (EOHP) is basically a variable conductance heat pipe for which the control properties are realized by the incorporation of a short electro-osmotic pumping section. This section, the 'EO-plug,' controls the liquid flow in the heat pipe wick system and, therefore, the flow rate supplied to the heat pipe evaporator. The underlying theory and the equations governing EOHP performance follow in straightforward fashion from combining heat pipe theory and electro-osmotic considerations. Theoretical considerations result in the definition of two new figures of merit: the electro-osmotic figure of merit, which compares electro-osmotic transport with capillary transport, and the transport capability reduction factor, which represents the flow reducing resistance caused by the EO-plug. Together with the classical heat pipe numbers (liquid transport number, wick number, and wicking height), these figures of merit make it possible to compare EOHP working fluids, plug configurations, and EOHP performance. C.R.

A83-16648#

PERFORMANCE CHARACTERISTICS OF THE DOUBLE-WALL ARTERY HIGH CAPACITY HEAT PIPE

R. PONNAPPAN (Universal Energy Systems, Dayton, OH) and T. MAHEFKEY (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH) American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 21st, Reno, NV, Jan. 10-13, 1983, 9 p USAF-supported research. refs (AIAA PAPER 83-0318)

The results of additional tests carried out on the double-wall artery heat pipes show that the condenser temperature drop is significantly reduced by increasing the vapor flow slot area (for a fixed condenser length) or by increasing the external surface area of the condenser (for a fixed vapor slot area geometry). The evaporator heat flux and transport capacity are shown to be significantly reduced by elimination of the fine groove structure on the inside of the outer tube. Theoretical predictions of maximum radial liquid pressure drop in the evaporator, adiabatic, and condenser sections are found to correlate well with observed experimental results. Estimates of evaporator superheats caused by the increased vapor pressure drop inherent in the inner tube vapor slot area restrictions suggest only small superheat differences when compared with the unrestricted open wicks for similar heat fluxes and temperatures. C.R.

A83-16649# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
RADIANT HEATING TESTS OF SEVERAL LIQUID METAL HEAT-PIPE SANDWICH PANELS

C. J. CAMARDA (NASA, Langley Research Center, Loads and Aeroelasticity Div., Hampton, VA) and A. BASIULIS (Hughes Aircraft Co., Dynamics Div., Torrance, CA) American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 21st, Reno, NV, Jan. 10-13, 1983, 8 p. refs (AIAA PAPER 83-0319)

Integral heat-pipe sandwich panels, which synergistically combine the thermal efficiency of heat pipes and the structural

efficiency of honeycomb sandwich construction, were conceived as a means of alleviating thermal stress problems in the Langley Scramjet Engine. Test panels which utilized two different wickable honeycomb cores, facesheets with screen mesh sintered to the internal surfaces, and a liquid metal working fluid (either sodium or potassium) were tested by radiant heating at various heat-load levels. The heat-pipe panels reduced maximum temperature differences by 31 percent with sodium working fluid and 45 percent with potassium working fluid. Results indicate that a heat-pipe sandwich panel is a potential, simple solution to the engine thermal stress problem. Other interesting applications of the concept include: cold plates for electronic component and circuit card cooling, radiators for large space platforms, low-distortion large area structures (e.g., space antennas) and laser mirrors. (Author)

A83-18446

STARTUP CONDITIONS OF ALKALI-METAL VAPORIZATION FROM RECTANGULAR CHANNELS

V. V. PROSVETOV and L. M. PROROK (Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii, Fiziko-Energeticheskii Institut, Obninsk, USSR) (Teplofizika Vysokikh Temperatur, vol. 20, May-June 1982, p. 515-521.) High Temperature, vol. 20, no. 3, Nov 1982, p. 441-447 Translation refs

Relations are obtained for determining the critical heat flux and temperature difference in a heat pipe under the startup conditions of liquid-metal vaporization from rectangular channels. The calculated and experimental values of the critical heat flux and the temperature difference in precritical and subcritical conditions of sodium vaporization from channels of width 0.68 mm are found to be in satisfactory agreement. Two limiting cases of heat-carrier vaporization from rectangular channels are found. The first is when the channel projections are dry, and the second is when the channel projections are completely wetted by heat carrier. C.R.

A83-19161

TRANSIENT SHUTDOWN OF AN AXIAL-GROOVE LIQUID TRAP HEAT PIPE THERMAL DIODE

M. GROLL and W. SUPPER Heat Transfer - Soviet Research, vol. 13, Nov.-Dec. 1981, p. 26-33 Translation

Experimental results for determination of the shutdown characteristics of a straight axial-groove aluminum liquid trap heat pipe diode are reported. The shutdown was effected by applying a constant heat flux to the condenser while leaving the evaporator and trap thermally free floating. A theoretical model was developed for the various heat flows and the transient diode shutdown, and the maximum heat transport of an aluminum axial-groove diode was calculated with respect to an ammonia fill charge at 20 C. The condenser temperature was found to rise faster than predicted, while the model and data agreed better toward the end of shutdown. A need for a better estimate of the thermal losses to the environment is indicated. The model is regarded as useful for spacecraft thermal control systems. M.S.K.

N83-10368# Siemens A.G., Berlin (West Germany). Bereich Energietechnik.

FUNDAMENTAL RESEARCH INTO HIGH VOLTAGES FOR FURTHER DEVELOPMENT OF ELECTRIC POWER DISTRIBUTION SYSTEMS Final Report, Dec. 1980

E. GOCKENBACH, W. BUCH, M. CRUCIUS, A. DIESSNER, and H. LUEHRMANN Bonn Bundesministerium fuer Forschung und Technologie May 1982 111 p refs Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-T-82-064; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 23.50

In order to guarantee correct electric power distribution, the use of voltages between 765 and 1200 kV was investigated. This fundamental research was conducted in an 1800 kV outdoor test station. After describing the connection and protection devices of the three stage high voltage generating transformer, and the tested equipment which has to withstand humidity, rain, dirt accumulation,

06 ENERGY TRANSPORT, TRANSMISSION, AND DISTRIBUTION

snow, ice, and wind, the recording equipment and the transient measurements which result from breakdowns in the SF₆ gas insulated equipment and from flashovers in long air gaps, are presented. To limit the effects of high voltage oscillation, damping resistance and short circuiting equipment on the primary side of the transformers were used. In this way, the overvoltages were prevented from rising to dangerous levels. Author (ESA)

N83-10370# Kabelmetal Electro G.m.b.H., Hannover (West Germany).

FLEXIBLE GAS INSULATED CABLE FOR HIGH POWER TRANSMISSION Final Report, Sep. 1981

J. ARTBAUER and W. RENFTEL Bonn Bundesministerium fuer Forschung und Technologie Jul. 1982 105 p refs In GERMAN, ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-T-82-099; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 22

The dielectric losses which increase as the square of voltage and limit power transmission capacity of paper/oil impregnated isolated cables were studied. This limitation disappears by using gas insulation. Tube transmission lines isolated with SF₆ gas were developed. Their conception was paired with a lot of inconveniences: short length, numerous connections, special curved sections and necessity of dilation joints. A test cable was fabricated from Al wire conductors, epoxy resin spacer insulators, and an external sheath of 3 mm thick Al-Mn alloy strip. A special high tension testing device was also constructed. The development of such a cable for 220 kV and of its components involved electric field computations, electrical, mechanical, and thermal measurements, elaboration of test and calculation methods, manufacture and testing of cable samples. Tests show that the transmission capacity of the cable in air surpasses 1000 MVA. Due to the limits set by the sheath diameter and the gas pressure, the 380 kV level cannot be attained with the design.

Author (ESA)

N83-10397# Vereinigte Elektrizitaetswerke Westfalen A.G., Dortmund (West Germany).

DETERMINATION OF FRICTION COEFFICIENTS ON SEVERAL DISTANT HEAT PIPE SECTIONS WITH DIFFERENT SLIDING PARTNERS Final Report, Dec. 1980

R. GERNUS and H. GERKEN Bonn Bundesministerium fuer Forschung und Technologie Jun. 1982 53 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-T-82-095; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 11

The sticking friction coefficients of supports with different sliding parameters were determined close to operating conditions. Test results on lines in operation with unexpected high sticking friction figures are cited. The sliding partners steel/steel, galvanized steel/steel, and Teflon/steel were studied. The sticking friction values were determined from normal forces, pull force, and displacement measure amplitudes. The results of these tests with steel point to greater values than generally known and refer to values for Teflon/steel bearings

Author (ESA)

N83-10428# Ruhrkohle A.G., Essen (West Germany).

DEVELOPMENT, CONSTRUCTION, AND EXPERIMENTAL OPERATION OF AN IMPROVED CHAINLESS HAULAGE SYSTEM FOR DRUM-SHEARER LOADERS Final Report, Dec. 1980

K. BRINKEN and K. H. KLIMEK Bonn Bundesministerium fuer Forschung und Technologie Jul. 1982 23 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-T-82-102; ISSN-0340-7608; RAG-317) Avail: NTIS HC A02/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 4,50

A model of a chainless hauling system was studied. Many defects were found when operating under severe working conditions. Further development tried to overcome these

weaknesses so that a modified system could improve production and viability. The new Rackatrack II system underwent successfully basic investigations. Subsequent underground testing took place. Run-out of the shearer-loader as a result of the cutting force action, wear and deformation of the pin-rack guides, and cleaning problems on the machine guides and the pin racks occurred during operation. Since the problems which arose revealed basic problems of the system and its design principles, it is not deemed useful to pursue this project. Author (ESA)

N83-10498# Houston Univ., Tex.

WATER DEMAND FOR GENERATING ELECTRICITY: A MATHEMATICAL PROGRAMMING APPROACH WITH APPLICATION IN POLAND

J. C. STONE, F. D. SINGLETON, JR., A. SALEWICZ (Inst. of Meteorol. and Water Management), M. GADKOWSKI (Inst. of Meteorol. and Water Management), and W. SIKORSKI (International Inst. for Applied Systems Analysis) Laxemburg, Austria International Inst. for Applied Systems Analysis Apr. 1982 66 p refs Sponsored by Stiftung Volkswagenwerk (IIASA-RR-82-16; ISBN-3-7045-0036-4) Avail: Issuing Activity

A resource use model for a coal fired power plant on a river was developed. The model optimizes plant design and operation in a number of user defined seasons. Alternative modes of coal transport, railroad, and slurry pipeline are modeled. Air and water quality dominate optimization. Coefficients are specified using matrix generators. Demand curves for water withdrawals and heat discharges, a water loss-withdrawal tradeoff, and the effects on the marginal and average costs of electricity due to reducing water withdrawals are calculated.

Author (ESA)

N83-12344# Los Alamos Scientific Lab., N. Mex.

SUPERCONDUCTING-TRANSMISSION-LINE PROJECT AT THE LOS ALAMOS NATIONAL LABORATORY Final Progress Report, 1 Oct. 1980 - 30 Sep. 1981

W. E. KELLER, comp., J. A. BARCLAY, K. C. LIM, M. P. MALEY, L. R. NEWKIRK, W. F. STEWART, J. D. THOMPSON, and F. A. VALENCIA Jul. 1982 38 p refs (Contract W-7405-ENG-36) (DE82-021835; LA-9342-PR) Avail: NTIS HC A03/MF A01

Results are presented of experiments aimed at developing advanced, high-capacity, power transmission conductors using superconducting materials derived from Nb₃Ge. Successful efforts for producing a model superconducting (Nb₃Sn) joint for use in superconducting lines are described. Realistic theoretical calculations have been completed on the cooldown of a model ac transmission line designed by the Brookhaven National Laboratory program. DOE

N83-12387# Argonne National Lab., Ill. Components Technology Div.

DEVELOPMENT OF ENHANCED HEAT TRANSFER/TRANSPORT/STORAGE SLURRIES FOR THERMAL-SYSTEM IMPROVEMENT

K. E. KASZA and M. M. CHEN (Illinois Univ., Urbana-Champaign) Jun. 1982 40 p refs (Contract W-31-109-ENG-38) (DE82-021236, ANL-82-50) Avail: NTIS HC A03/MF A01

Combined utilization of the phenomenon of increased energy transport due to the phase transition of an immiscible change of phase additive to a carrier fluid (slurry) with the recently recognized phenomenon of enhanced heat transfer at a surface due to particle/fluid boundary-layer interaction can be used to enhance overall thermal system performance. The enhancement will also be realized in conjunction with thermal systems employing direct contact heat exchangers. A benefit accruable from using phase change slurries in thermal systems rather than single phase sensible heat fluids are increased fluid/solid surface heat transfer coefficients resulting from several mechanisms. This reduces the temperature difference required for a given amount of heat transfer and allows reductions in heat transfer surface areas. DOE

N83-12525*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

HEAT PIPE THERMAL SWITCH Patent Application

D. A. WOLF, Inventor (to NASA) (Dynatherm Corp.) 15 Oct. 1982 12 p Sponsored by NASA

(NASA-CASE-GSC-12812-1; US-PATENT-APPL-SN-434674)

Avail: NTIS HC A02/MF A01 CSCL 10A

A thermal switch for controlling the dissipation of heat between a body acting as a heat source, and a heat sink is presented. The thermal switch is comprised of a flexible bellows defining an expandable vapor chamber for a working fluid located between an evaporation and condensation chamber. Inside the bellows is located a coiled retaining spring and four axial metal mesh wicks, two of which have their central portions located inside of the spring while the other two have their central portions located between the spring and the side wall of the bellows. The wicks are terminated and are attached to the inner surfaces of the outer end walls of evaporation and condensation chambers respectively located adjacent the heat source and heat sink. NASA

N83-13248# Societe Anonyme Belge de Constructions Aeronautiques, Brussels (Belgium).

AGING OF SMALL CRYOGENIC HEAT PIPES Final Report

Paris ESA 31 Mar. 1982 85 p refs

(SABCA-JPM/LN/H05/N28; ESA-CR(P)-1631) Avail: NTIS HC A05/MF A01

Stainless steel heat pipes with a diameter of 3mm and 6mm, charged with nitrogen, methane and ethane were placed in a chamber cooled with liquid nitrogen and operated during one year at a temperature within the working range of each heat carrier. Temperature distributions were monitored continuously and power performance was checked quarterly. A full performance test carried out after one year aging does not reveal significant degradations.

Author (ESA)

N83-13310# Battelle Columbus Labs., Ohio.

SYMPOSIUM ON PULSE-COMBUSTION APPLICATIONS. VOLUME 1: PROCEEDINGS

Mar. 1982 323 p refs Symp. held in Atlanta, 2-3 Mar. 1982 Sponsored by Brookhaven National Lab. and Gas Research Inst. 2 Vol.

(PB82-240060; BCL-N-4007-1; GRI-82/0009.2-VOL-1) Avail: NTIS HC A14/MF A01 CSCL 13A

Pulse-combustion systems designed to take advantage of the phenomena of combustion-driven pulsations are discussed. Both recent R&D findings and field experience with commercialized equipment are covered. Applications include space heating, water heating, and industrial processes. Pulse-combustion systems are of special current interest because of their potential in firing efficient heating equipment having compact heat exchangers, including those operating in the condensing mode. GRA

N83-13311# Battelle Columbus Labs., Ohio.

SYMPOSIUM ON CONDENSING HEAT EXCHANGERS. VOLUME 2: PROCEEDINGS

Mar. 1982 386 p refs Symp. held in Atlanta, 3-4 Mar. 1982 Sponsored in by Brookhaven National Lab. and Gas Research Inst. 2 Vol.

(PB82-240078; BCL-N-4007-2; GRI-82/0009.3-VOL-2) Avail: NTIS HC A17/MF A01 CSCL 13A

Heat exchangers designed to recover a portion of the latent heat of the water vapor formed in the combustion process are discussed. They are applicable to equipment fired by either conventional power burners or pulse-combustion systems. Heat exchanger concepts and performance, corrosion resistant materials, condensate disposal, venting of flue gases and codes and standards are considered. Applications include use of condensing heat exchangers in conjunction with furnaces for space heating, and also with boilers for generation of steam or hot water for use in space heating or industrial processing. GRA

N83-15892# Thermacore, Inc., Lancaster, Pa.

THE NEED FOR IMPROVED HEAT PIPE FLUIDS Final Report

D. M. ERNST and G. Y. EASTMAN /in R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 2 15 p 1982 refs

Avail: NTIS HC A99/MF A01

Low mass high performance radiators and thermal management systems for advanced space systems are discussed. The key to these new improved thermal systems are high performance heat pipes. One aspect in achieving low mass/high performance heat pipes requires working fluids compatible with low mass materials of construction, such as aluminum, magnesium, beryllium and titanium. The application of heat pipe systems in manned spacecraft also requires the use of low or nontoxic working fluids. The development of new or improved heat pipe fluid/vessel combinations for advanced space systems should be carried out. Two approaches worthy of investigation are: the synthesis of new high performance fluids compatible with appropriate envelope materials and the development of integral impervious coatings and/or passivation to prevent the reaction of currently acceptable working fluids with the envelope. R.J.F.

N83-15894# Little (Arthur D.), Inc., Cambridge, Mass.

TWO-PHASE HEAT TRANSPORT FOR THERMAL CONTROL Final Report

A. A. FOWLE /in R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 2 18 p 1982 refs

Avail: NTIS HC A99/MF A01

The concept of the pumped, two phase flow heat transport system is discussed. The system consists of a closed fluid loop maintained in circulation by a pump. The fluid is preconditioned in a supply reservoir to be near saturation at a temperature level best suited to provide the heat source or sink necessary to the temperature control of the subsystems on the loop. A liquid vapor, two phase, saturated mixture of the working liquid is made to flow through heat stations (instrument modules in the case shown) arranged in series along the flow loop. Heat exchange at the heat stations involves change of phase, either condensation or evaporation, depending on whether cooling or heat addition is required. The net heat added by all instrument modules is rejected by a space radiator. The radiator functions as a condenser and is sized to handle the largest net heat addition to the fluid loop occurring during operation of the system. A temperature controlled fluid bypass and mixing valve (or other means) establishes the set point temperature of the fluid in the reservoir slightly below the saturation temperature corresponding to its pressure. The pump inlet is, therefore, supplied with slightly subcooled liquid from the reservoir to minimize the power required to circulate the fluid in the loop and to avoid cavitation induced difficulties. R.J.F.

07

ENERGY STORAGE

Includes flywheels, heat storage, underground air storage, compressed air, storage batteries, and electric hybrid vehicles.

A83-10651#

PERFORMANCE INVESTIGATION OF A LONG, SLENDER HEAT PIPE FOR THERMAL ENERGY STORAGE APPLICATIONS

A. ABHAT (Stuttgart, Universitaet, Stuttgart, West Germany) Journal of Energy, vol. 6, Nov.-Dec. 1982, p. 361-367. refs

(Previously cited in issue 17, p. 3217, Accession no. A80-41473)

07 ENERGY STORAGE

A83-11509

METALLURGY OF RECHARGEABLE HYDRIDES

P. S. RUDMAN and G. D. SANDROCK (Inco Research and Development Center, Inc., Suffern, NY) In: Annual review of materials science. Volume 12. Palo Alto, CA, Annual Reviews, Inc., 1982, p. 271-294. refs

Thermodynamic principles of metal-hydrogen (M-H) systems are reviewed, and the theory and practice of M-H alloys are detailed. Pseudobinary systems, phase transformations, and metastability are briefly discussed. The LaNi₅-H system is used to examine plateau slope and hysteresis in M-H alloy formation, and the rules of simple averaging and reversed stability are assessed with respect to their usefulness in predicting the behavior of such systems. The crystal structure of metal hydrides is addressed, including AB, AB₂, and AB₅ structure. Finally, the use of ternary substitutional alloying in controlling the thermodynamic properties of M-H systems is discussed, illustrating the substitution of copper for nickel in LaNi₅ and the dependence of the equilibrium pressure on the unit cell volume of various CaCu₅ type compounds. C.D.

A83-11813* Jet Propulsion Lab., California Inst. of Tech., Pasadena

POLYMERIC METALLIC ELECTRODES FOR RECHARGEABLE BATTERY APPLICATIONS

R. SOMOANO (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA) Applied Physics Communications, vol. 1, no. 2, 1981-1982, p. 179-191. refs
(Contract NAS7-100)

A review is presented on the status of plastic metal electrodes, emphasizing the use of polyacetylene as a prototype polymeric material. The electrochemical characteristics of polyacetylene are examined; and the potential use of this material, as well as other types of plastic metal electrodes, in batteries is evaluated. Several problem areas which must be solved before polyacetylene can be widely used in battery applications are discussed, including the problem of electrolyte stability, the problem that the depth of discharge and the energy density is limited by the metal-semiconductor transition, and also the poor electrochemical performance of impure material. N.B.

A83-12054

SOURCES OF PRESSURE IN LITHIUM THIONYL CHLORIDE BATTERIES

R. C. McDONALD (GTE Sylvania, Waltham, MA) Electrochemical Society, Journal, vol. 129, Nov. 1982, p. 2453-2457. refs
(Contract F04704-78-C-0001)

The generation of pressure in Li/SOCl₂ batteries has been investigated. Hydrogen, sulfur dioxide, and nitrogen are the principal gases evolved. Reaction of lithium metal with protic species in the liquid electrolyte produces hydrogen gas on open circuit and more rapidly on discharge. Sulfur dioxide is a product of electrochemical discharge. Nitrogen, trapped in lithium metal as dissolved gas or as lithium nitride is released during discharge. In addition, smaller amounts of gas, trapped in cathode pores and adsorbed on the surface of carbon, are evolved when discharge products are deposited in the cathode. Hydrogen pressure is very sensitive to the care used in drying the electrolyte and cathodes. Alternate cycles of evacuation and backfill with SO₂ eliminate much of the moisture and trapped gas from the cell prior to filling with electrolyte. (Author)

A83-12055

TRANSPORT PROPERTIES OF NAFION MEMBRANES FOR USE IN THREE-ELECTRODE PHOTOELECTROCHEMICAL STORAGE CELLS

P. BRATIN and M. TOMKIEWICZ (Brooklyn College, Brooklyn, NY) Electrochemical Society, Journal, vol. 129, Nov. 1982, p. 2469-2473. refs
(Contract XS-9-8312-1)

The diffusion coefficients and fluxes of sulfide and polysulfide species through Nafion membranes have been determined in order to correlate the physical properties of these membranes with their actual performance in three-electrode photoelectrochemical

storage cells. Diffusion coefficients for sulfide range from about 3×10^{-9} to 1×10^{-7} sq cm/sec, depending on the equivalent weight and thickness of the membrane, and the pH of the solution. Diffusion coefficients for polysulfide are considerably lower, and some reasons are discussed. A Nafion 315 membrane was chosen for the first test in the storage system and the results of the test are presented. (Author)

A83-14045

INTERNATIONAL CONFERENCE ON ENERGY STORAGE, BRIGHTON, SUSSEX, ENGLAND, APRIL 29-MAY 1, 1981, PROCEEDINGS

Conference sponsored by BHRA Fluid Engineering, Cranfield, Beds., England, BHRA Fluid Engineering, 1981. 389 p.

Current developmental, experimental, and production prototype energy storage systems are surveyed, with an emphasis on European programs and products. Attention is given to chemical, thermochemical/heat pump combinations, and reversible reaction heat storage methods. Applications of zeolite, hydrogenated cyclohexane, and fluidized media are examined, as are thermal storage options for industry and utilities. Phase change materials in bulk, encapsulated, and sodium acetate forms are reviewed, particularly for solar energy thermal storage. The compatibility of construction materials with latent heat storage is discussed. Battery systems for transport vehicles, load leveling, and storage of solar and wind-derived electricity are described. Aquifer storage is explored, together with underground pumped hydro and compressed air energy storage, a two-basin tidal power scheme, and kinetic energy rings such as flywheels. M.S.K.

A83-18562

THE EFFECT OF CRYSTAL SIZE ON THE THERMAL ENERGY STORAGE CAPACITY OF THICKENED GLAUBER'S SALT

S. B. MARKS (Delaware University, Newark, DE) Solar Energy, vol. 30, no. 1, 1983, p. 45-49. Research supported by the Pennsylvania Power and Light Co. refs

N83-10373# National Academy of Sciences - National Research Council, Washington, D. C. High Energy Density Capacitors and Dielectric Materials Committee.

PROCEEDINGS OF A SYMPOSIUM ON HIGH ENERGY DENSITY CAPACITORS AND DIELECTRIC MATERIALS

C. W. REED, ed. 1981. 204 p. refs. Symp. held at Boston, 28 Oct. 1980. Prepared for Sandia National Labs.
(PB82-197344) Avail: NTIS HC A10/MF A01 CSCL 09A

Several diverse applications, space satellites, weapons, laser fusion, and specialized power supplies, demand capacitors with higher energy densities (in joules per gram) than are ordinarily available in commercial capacitors for industrial and utility applications. Such high energy density capacitors experience a wide variety of duty cycles (from single pulses to continuous operation) and require special features such as compactness, lightness, long shelf life, or very high reliability. The state of the art in high energy density capacitor technology is summarized, and areas of that technology in particular need of improvement are identified. GRA

N83-10558*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

EXPECTED CYCLE LIFE VERSUS DEPTH OF DISCHARGE RELATIONSHIPS OF WELL BEHAVED SINGLE CELLS AND CELL STRINGS

L. H. THALLER 1982. 17 p. refs. Presented at the 162d Meeting of the Electrochem. Soc., Detroit, 17-22 Oct. 1982. (NASA-TM-82957; E-1372; NAS 1.15.82957) Avail: NTIS HC A02/MF A01 CSCL 10C

The factors that might influence the cycle life vs. depth of discharge relationship are examined. This is done first at the single cell level using a progressively more complex cell life model. This is then extended to multicell battery strings where the stochastic aspects associated with groupings of cells are introduced. These relationships are important when considering the weight, cost, and life of battery packs. The results of this theoretical study are

compared with a recent review of actual cell cycling data. The factors examined are the rate of capacity loss, the amount of excess capacity built into the cells, and the penalty in capacity loss resulting from the use of deep depths of discharge. This study suggests that the relationship between cycle life and depth of discharge is not one that can be varied of significantly improved by cell research. The relationship appears to be determined by certain more or less fixed cell parameters. Among multicell strings, the standard deviation, as expected, plays an important role in determining overall battery life. Author

N83-10614# Friedrichsfeld G.m.b.H., Mannheim (West Germany). Steinzeug Und Kunststoffwerke.

PRODUCTION TECHNOLOGY OF AN ELECTROLYTE FOR Na/S BATTERIES Final Progress Report, Jun. 1980

G. HEIMKE, H. MAYER, and A. RECKZIEGEL Bonn Bundesministerium fuer Forschung und Technologie May 1982 82 p refs Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-T-82-065; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 17

The trend to develop a cheap electrochemical electric battery and the development of the Na/S system are discussed. The main element in this type of battery is the beta Al_2O_3 solid electrolyte. Characteristics for this material of first importance are: specific surface, density of green and of sintered material, absence of cracks, gas permeability, resistance to flexion, purity, electrical conductivity, crystal structure and dimensions. Influence of production method on all these characteristics were investigated, e.g., method of compacting powder, tunnel kiln sintering versus static chamber furnace sintering, sintering inside a container or not, and type of kiln material when sintering in a container. In the stationary chamber furnace, beta alumina ceramics were produced with a density of 3.2 g/cm³, a mechanical strength higher than 160 MPa, and an electrical conductivity of about 0.125 Ohm⁻¹cm⁻¹ at 300 C. The best kiln material proved to be MgO and MgAl₂O₃.MgO ceramics. Author (ESA)

N83-10619# Gesamthochschule, Kassel (West Germany). Arbeitsgruppe Technische Physik.

ELECTRON CONDUCTIVITY OF THE ACTIVE MASSES OF LEAD ACID BATTERIES DURING DISCHARGE AND PERMANENT SERVICE Final Report, Oct. 1980

H. METZENDORF Bonn Bundesministerium fuer Forschung und Technologie Jun. 1982 102 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-T-82-078; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 21,50

Electrical and structural properties of positive and negative grid plate electrodes in lead acid batteries were investigated during a single discharge and during permanent service. Theories of two phase resistor networks show an insulating behavior if there is more than a certain amount of a bad conducting phase. Results show that it is possible to describe the utilization of the electrodes during a single discharge at low current densities with these theories. The discharge is stopped by the breakdown of the electron conductivity of the active masses. A model is developed from which it is possible to calculate current distribution during discharge at low current densities. From this, conclusions are drawn as to the discharge behavior at high current densities. Author (ESA)

N83-10627# Institut fuer Kemtechnik und Energiewandlung e.V., Stuttgart (West Germany). Abteilung Energiewandlung und Waermetechnik.

INVESTIGATION OF HEAT STORAGE FOR TEMPERATURE RANGE FROM 200 TO 500 C Final Report, Jun. 1981

D. STEINER, D. HEINE, and A. NONNENMACHER Bonn Bundesministerium fuer Forschung und Technologie Jul. 1982 351 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-T-82-105; ISSN-0340-7608) Avail: NTIS HC A15/MF A01, Fachinformationszentrum, Karlsruhe, West Germany DM 51,60

Possible heat storage methods for a temperature range from 200 to 500 C are reviewed to obtain higher specific heat content and to work at lower pressures. Three possible storage methods: sensible heat, latent heat or reversible chemical reactions, are reviewed. The thermodynamic quality and the efficiency of the storage system are defined. The material resistance, the cost, the thermodynamic quality, and the maintenance problems of the heat storage systems are discussed. Physical characteristic figures of possible heat storage materials are given. The various storage techniques are assessed with respect to thermal power plant applications. A thermal and cost analysis was carried out for oil/solid, molten salt/solid, or latent heat storage systems. Storage in oil or in the combination oil/solid material must be considered as an alternative to hot water storage. Author (ESA)

N83-11017# California Univ., Livermore Lawrence Livermore Lab.

COMPOSITE-MATERIAL FLYWHEELS AND CONTAINMENT SYSTEMS

S. V. KULKARNI In *its Energy and Technol. Rev.*, Mar. 1982 p 18-29 Mar. 1982

Avail: NTIS HC A03/MF A01
The development of composite-material flywheels and containment systems is reviewed. Author

N83-11578# National Building Research Inst., Pretoria (South Africa).

THE PREDICTION OF THE THERMAL PERFORMANCE OF BUILDING BY THE CR-METHOD

J. D. WENTZEL, R. J. PAGE-SHIPPI, and J. A. VENTER 1981 26 p (CSIR-BRR-396; ISBN-0-7988-2047-0) Avail: NTIS HC A03/MF A01

A method for predicting the hottest and coldest likely indoor conditions in a house, given the materials of construction, general design details and layout is described. The procedure is based on an analysis of many measured values and thus requires no experimental verification. Although the calculation procedure, which is fully analyzed and illustrated by means of an example, is fairly complex, it requires no knowledge of advanced mathematics and all calculations can be done on a hand calculator. The procedure is not meant to replace sophisticated building energy and thermal performance prediction computer programs but is aimed at users who do not have computer facilities but nevertheless wish to assess the likely thermal performance of different structures. The product of heat storage capacity (C) and weighted or equivalent resistance to heat flow (R) comprise one prediction method. The procedure assumes reasonable provision of cross-ventilation and also that windows are shaded to prevent direct sun penetration in summer. Author

N83-11580*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

OAO-3 END OF MISSION POWER SUBSYSTEM EVALUATION

M. TASEVOLI Aug. 1982 38 p refs Presented at the 17th IECEC, Los Angeles, 8-13 Aug. 1982 (NASA-TM-83959; NAS 1.15:83959) Avail: NTIS HC A03/MF A01 CSCL 10C

End of mission tests were performed on the OAO-3 power subsystem in three component areas: solar array, nickel-cadmium batteries and the On-Board Processor (OBP) power boost

07 ENERGY STORAGE

operation. Solar array evaluation consisted of analyzing array performance characteristics and comparing them to earlier flight data. Measured solar array degradation of 14.1 to 17.7% after 8 1/3 years is in good agreement with theoretical radiation damage losses. Battery discharge characteristics were compared to results of laboratory life cycle tests performed on similar cells. Comparison of cell voltage profiles reveals close correlation and confirms the validity of real time life cycle simulation. The successful operation of the system in the OBP/power boost regulation mode demonstrates the excellent life, reliability and greater system utilization of power subsystems using maximum power trackers.

Author

N83-11582# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

INDUCTIVE ENERGY STORES

L. P. POBEREZHSKIY 9 Jul 1982 16 p refs Transl. into ENGLISH from Tr. Mosk. Energ. Inst. Elektroenerg. (USSR), no. 45, 1962 p 170-181

(AD-A118337; FTD-ID(RS)T-0877-82) Avail: NTIS HC A02/MF A01 CSCL 09A

Inductive energy stores research is reviewed. Discharge of the store is considered mathematically. Inductance coils are also discussed. NW.

N83-11584# Eltra Corp., Plymouth Meeting, Pa. Batteries Div. **RESEARCH, DEVELOPMENT, AND DEMONSTRATION OF ADVANCED LEAD-ACID BATTERIES FOR UTILITY LOAD LEVELING Final Summary Report**

Mar. 1982 52 p refs

(Contract W-31-109-ENG-38)

(DE82-019796, ANL/OEPM-81-15) Avail: NTIS HC A04/MF A01

A cost and design study was conducted on the production of lead-acid batteries. The major conclusions with regard to a mature level of production, 1000 man-work hours (MWH) per year in 100 MWH installations, are the following: using vertically integrated, automated plants, and a 14 KAH cell design, it is projected that the 100 MWH battery can be manufactured for \$76 per kilowatt hour (KWH). The large 10 and 14 kilowatt ampere hour (KAH) cells were found to be more economical than the small 3.4 KAH (6.5 KWH) cell. It is inferred that batteries prepared from large, cell sizes (10 and 14 KAH) will be inherently more reliable due to the reduced number of intercell connections and reduced number of cells requiring maintenance operations, compared to batteries made with small cells (3400 AH). The battery footprint energy density goal can be achieved with tiering of the 14 KAH cell and the specification of somewhat reduced aisle widths on the outside of the strings. Sensitivity studies were performed on the impact of lead price, design cycle life, materials cost reductions, and increase in active materials utilization on the cost of the 100 MWH battery. DOE

N83-11599# Brown, Boveri und Cie, A.G., Heidelberg (West Germany). Zentralesforschungslabor/energiespeicherung.

DEVELOPMENT OF THE SODIUM/SULFUR BATTERIES, PHASE 2 Final Report, Feb. 1981

B. ADAMOWICZ, R. BAUER, W. DOERRSCHEIDT, H. ESROM, W. FISCHER, W. HAAR, F. HARBACH, B. HARTMANN, D. HASENAUER, U. HUMRICH et al. Bonn Bundesministerium fuer Forschung und Technologie Aug. 1982 203 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-142; ISSN-0340-7608) Avail: NTIS HC A10/MF A01, Fachinformationszentrum, Karlsruhe, West Germany DM 36,50

In continuation of Na/S battery development major subjects were studied: optimization of cell performance; battery measurements, first practical battery test; and development of vacuum powder insulation. The energy density of standard cells was increased to 150 kWh/kg, at a discharging time of two hours, the maximum power density 120 W/kg. The average duration of life was increased to 1350 charge/discharge cycles; 7 kWh

batteries containing 112 individual cells revealed characteristics which were expected from single cell measurements. Two of these batteries were successfully tested in a van. The heat losses of vacuum powder insulation amount to 70 W/m²; they are lower than the losses from a conventional heat insulation of 80 mm thickness. Author (ESA)

N83-11610# Swedish Council for Building Research, Stockholm. **THERMOCHEMICAL HEAT STORAGE: STATE-OF-THE-ART REPORT**

G. OELERT, H. BEHRET, W. FRIEDEL, B. HENNEMANN, and D. HODGETT 1982 164 p refs

(PB82-188087; ISBN-91-540-3653-4) Avail: NTIS HC A08/MF A01 CSCL 10C

A thermochemical heat storage (TCHS) survey and assessment study is reported. Emphasis is given to energy use in buildings, but aspects of the industrial application of thermochemical heat storage are included. Systems of the type heat-in yields thermochemical reaction, yields heat-out are considered. Hydrogen technology, electrochemical, and photochemical methods are excluded. Various applications are considered, covering the most important sectors of energy consumption in Sweden. In this context, discontinuous sorption heat pumps, chemical heat storage, chemical heat pipes, and continuous sorption heat pumps are studied. Author (GRA)

N83-12561# Fenix and Scisson, Inc., Tulsa, Okla.

PRELIMINARY DESIGN STUDY OF COMPRESSED-AIR ENERGY STORAGE IN A SALT DOME. VOLUME 4. CAES TURBOMACHINERY DESIGN Final Report

P. ZAUGG, ed. Jun. 1982 273 p refs Prepared in cooperation with Middle South Services, Inc. and Brown Boveri Corp., North Brunswick and United Engineers and Constructors, Inc. 7 Vol. (Contract DE-AC02-77ET-29015; EPRI PROJ. 1081-2)

(DE82-019781; EPRI-EM-2210-VOL-4; DOE/ET-5054/4) Avail: NTIS HC A12/MF A01

The question of whether it would be possible to build an air storage generating plant capable of operating economically and using leached out salt domes as air reservoirs was investigated. All the previous reports, most of which have been revised to a large extent, are included. DOE

N83-12572# Energy Research Corp., Danbury, Conn. Energy and Environment Div.

DEVELOPMENT OF A HIGH-RATE INSOLUBLE ZINC ELECTRODE FOR ALKALINE BATTERIES

A. CHARKEY Apr. 1982 33 p

(Contract DE-AC03-76SF-00098)

(DE82-020608; LBL-14674) Avail: NTIS HC A03/MF A01

The development of an insoluble zinc electrode for alkaline batteries is discussed. Active material was mixed dry with materials which would provide an insoluble matrix after initial reaction in the cell electrolyte. These electrodes are expected to exhibit improved performance in two ways. Firstly, there is an even distribution of permanent, highly conductive nucleation sites along the apparent electrode surface, providing for even Zn deposition and distribution during charging. Secondly, the increase in effective surface area decreases actual current densities, thereby, decreasing overvoltages. This should decrease dendrite formation and gas evolution in addition to allowing for the use of higher apparent current densities. Problems posed by the development of this type of electrode material are, for the most part, material selection problems. Materials must be chosen carefully, not just to fulfill their given function within the electrode system, but also to provide for minimal counterproductive interaction with each other. DOE

N83-12573# California Univ., Berkeley. Lawrence Berkeley Lab.

TECHNOLOGY-BASE RESEARCH PROJECT FOR ELECTROCHEMICAL STORAGE REPORT FOR 1981

F. MCLARNON, ed. Jun. 1982 95 p refs

(Contract DE-AC03-76SF-00098)

(DE82-020599; LBL-14305) Avail: NTIS HC A05/MF A01

The technology base research (TBR) project which provides the applied research base that supports all electrochemical energy storage applications: electric vehicles, electric load leveling, storage of solar electricity, and energy and resource conservation is described. The TBR identifies electrochemical technologies with the potential to satisfy stringent performance and economic requirements and transfer them to industry for further development and scale up. The TBR project consists of four major elements: electrochemical systems research, supporting research, electrochemical processes, and fuel cells for transportation. Activities in these four project elements during 1981 are summarized. Information is included on: iron-air batteries; aluminum-air batteries; lithium-metal sulfide cells; materials development for various batteries; and the characteristics of an NH₃-air alkaline fuel cell in a vehicle. DOE

N83-12582# Westinghouse Electric Corp., Pittsburgh, Pa. **RESEARCH, DEVELOPMENT AND DEMONSTRATION OF NICKEL-IRON BATTERIES FOR ELECTRIC-VEHICLE PROPULSION Annual Report, 1981**

Mar. 1982 128 p

(Contract W-31-109-ENG-38)

(DE82-021216; ANL/OEPM-81-14) Avail: NTIS HC A07/MF A01

Full-size, prototype cell, module and battery fabrication and evaluation, aimed at advancing the technical capabilities of the nickel-iron battery, while simultaneously reducing its potential cost in materials and process areas are discussed. Improved electroprecipitation process nickel electrodes of design thickness (2.5 mm) are now being prepared that display stable capacities for the C/3 drain rate with less than 10% capacity decline for greater than 1000 test cycles. Iron electrodes of the composite-type are delivering 24 Ah at the target thickness (1.0 mm). Iron electrodes also are displaying capacity stability for greater than 1000 test cycles in continuing 3-plate cell tests. Finished cells delivered 57 to 63 Wh/kg at C/3, and have demonstrated cyclic stability up to 1200 cycles at 80 percent depth of discharge profiles. Modules exceeded 580 test cycles and remain on test. Reduction in nickel electrode swelling (and concurrent stack starvation), to improve cycling, continues to be an area of major effort to reach the final battery cycle life objectives. DOE

N83-12583# Argonne National Lab., Ill. **ANNUAL SYNOPSIS OF ARGONNE'S AQUEOUS BATTERY SUPPORT RESEARCH, FISCAL YEAR 1981**

Mar. 1982 38 p refs

(Contract W-7405-ENG-38)

(DE82-021143; ANL/OEPM-82-3) Avail: NTIS HC A03/MF A01

The major activities of the Battery Support Group research staff for fiscal year 1981 are described. The present activities are ultimately directed at improving the performance of lead-acid, nickel/zinc and nickel/iron batteries, especially those for electric vehicle or utility load-leveling applications. In addition to short descriptions of each of the projects, summaries of work accepted for publication, published or presented during the year are included. DOE

N83-13415# Science Research Council, Chilton (England).

HEAT STORAGE AND HEAT PUMPS

F. M. RUSSELL 1982 16 p Summary of workshop held at Cosensers House, England, 3-4 Feb. 1982

(PB82-226481; RL-82-031) Avail: NTIS HC A02/MF A01 CSCL 13A

The subject of the Workshop was the case for, and technological aspects of combined heat stores and heat pumps. The objective was to identify areas of uncertainty or novelty to

assist in formulating a program of perceived relevance to industry. It was concluded that combining heat stores with heat pumps increased the application areas gas heat pumps and gave increased flexibility in sizing and operation of such installations.

Author (GRA)

N83-13590# Harry Diamond Labs., Adelphi, Md.

THERMAL BATTERY SYSTEMS FOR ORDNANCE FUZING

F. C. KRIEGER Jul. 1982 25 p refs

(Contract DA PROJ. 1L1-62603-AH-18; HDL PROJ. A18147)

(AD-A119155; HDL-TR-1989) Avail: NTIS HC A02/MF A01 CSCL 10C

Thermal battery technology for ordnance fuzing is reviewed. Most present thermal batteries use the Ca/LiCl-KCl eutectic/CaCrO₄ system. This system is highly reliable when properly fabricated, but is subject to electrical short circuiting from CaLi₂ formed during operation and is capacity and rate limited by anodic film formation. Proposed replacement electrochemical systems use lithium or its alloys as anodes to eliminate these difficulties, but the high chemical reactivity of lithium causes storage and handling problems. Anodes of calcium alloys might eliminate short circuiting and increase electrical output above that of the Ca/LiCl-KCl eutectic/CaCrO₄ system without causing the handling and storage difficulties of the lithium systems. The calcium alloy anode should be researched to determine its capabilities in practical batteries. Author (GRA)

N83-13591# Honeywell Power Sources Center, Horsham, Pa. **LITHIUM-SULFUR DIOXIDE (Li/SO₂) BATTERY SAFETY HAZARDS. THERMAL STUDIES Final Report, 24 Dec. 1980 - 5 Mar. 1982**

W. B. EBNER, K. Y. KIM, and H. V. VENKATASETTY Mar 1982 246 p

(Contract N60921-81-C-0085)

(AD-A119381) Avail: NTIS HC A11/MF A01 CSCL 10C

In this program, the Accelerating Rate Calorimeter (ARC) has been employed to study the thermal and pressure behavior of exothermic reactions occurring in Li/SO₂ cells under the conditions of (1) forced overdischarge at ambient temperature, (2) resistive overdischarge at ambient temperature, (3) forced overdischarge at -35 C, and (4) discharge at -35 C. Detected reactions have been characterized in terms of self-heating rate, rate of pressure generation, magnitude of overall heat generation, magnitude of overall pressure rise, and kinetic parameters including activation energy and reaction order. Micro-calorimeter studies determined the heat of reaction for the lithium/acetone nitrile reaction to be -54 ± or - 1.0 kcal/mole-Li. Lithium/aluminum alloy was found to be unreactive with acetone nitrile at ambient temperature. Preliminary investigations were also carried out using FTIR spectroscopy to study the products of electrolyte oxidation on nickel and stainless steel electrodes. Author (GRA)

N83-13592# Air Force Wright Aeronautical Labs, Wright-Patterson AFB, Ohio Aerospace Power Div.

TESTING OF AN IMPROVED LITHIUM-SULFUR DIOXIDE BATTERY FOR AIRCREW LIFE SUPPORT EQUIPMENT Final Report, Jan. 1979 - Oct. 1981

J. S. CLOYD May 1982 103 p refs

(Contract AF PROJ. 412A)

(AD-A119374; AFWAL-TR-81-2137) Avail: NTIS HC A06/MF A01 CSCL 10C

This report presents the results of in-house testing of lithium-sulfur dioxide cells. The report includes performance testing of an engineering prototype design of lithium-sulfur dioxide cells and the performance characterization, storage evaluations and abuse test behavior of the pilot production cell design. Several design modifications occurred during the development of this lithium-sulfur dioxide cell technology which significantly changed their performance. Testing of the pilot production cells included: (1) Performance evaluations at rates of 50MA, 100MA, 200MA, and 400 MA at temperatures from -65 F to +140 F; (2) Room temperature discharge tests at high rates of current; (3) Capacity retention capability as a function of storage time at temperatures

07 ENERGY STORAGE

of 32 F, 70 F and 160 F; (4) Evaluation of intermittent storage capability at 205 F; and (5) Abuse testing. Abuse testing included short circuit, nail penetration, and forced overdischarge conditions. GRA

N83-13607# Acres American, Inc., Buffalo, N.Y.
PRELIMINARY DESIGN STUDY OF UNDERGROUND PUMPED HYDRO AND COMPRESSED-AIR ENERGY STORAGE IN HARD ROCK. VOLUME 8: DESIGN APPROACHES - UPH. APPENDIX B: SHAFTS Final Report

Apr. 1981 92 p Sponsored by EPRI
(Contract DE-AC02-77ET-28013; EPRI PROJ. 1081-1)
(DE81-028202, EPRI-EM-1589-VOL-8-APP-B;
DOE/ET-5047-VOL-8-APP-B) Avail: NTIS HC A05/MF A01

An assessment of shaft requirements for an underground pumped hydroelectric (UPH) facility is documented. Shaft requirements for both the construction and the permanent operation phases of the facility are outlined. Possible shaft arrangements are developed and the design of shaft linings is discussed. Methods of shaft sinking are reviewed. Alternative schedules for the sinking of the shafts are described and a preferred schedule selected. The material presented and also the cost estimates are based on the requirements for a 2000 MW plant providing 20,000 MWh of storage with a nominal head of 4600 ft. Studies subsequently carried out, including power plant design, head optimization analyses for the overall UPH surface and underground configuration, and further refinement of selected designs, have modified some of the material given. DOE

N83-13609# Argonne National Lab., Ill.
OPTIMAL SIZING OF HEATING SYSTEMS THAT STORE AND USE THERMAL ENERGY

H. N. HERSH Jun. 1981 59 p refs
(Contract W-31-109-ENG-38)
(DE82-003011; ANL/SPG-18) Avail: NTIS HC A04/MF A01

An analysis of the factors that enter into the sizing of thermal energy storage (TES) space heating systems is given. These TES systems, having to fulfill the same thermal comfort functions as conventional space heating systems, have different operating characteristics and more severe constraints, and therefore require different and more critical sizing procedures. Thermal energy storage heating systems offer social and private benefits, and the achievement of these benefits depends in large part on proper sizing. Proper sizing is a probabilistic rather than a deterministic procedure, and is utility-specific as well. Analysis of experimental data obtained in field studies of TES in New England provided information on the accuracy of equipment-sizing procedures used by vendors and on the consequences of undersizing and oversizing. Based on simulation studies and other techniques, additional useful sizing information was developed. The information implies the need for an upward adjustment of the sizing factor if the sizing is to be optimal for US climatological conditions and living habits. A summary and a general theoretical analysis of the information presented in this report are then combined to provide guidelines for optimally sizing TES systems. DOE

N83-13610# Public Service Co. of Indiana, Plainfield
COMPRESSED-AIR ENERGY STORAGE PRELIMINARY DESIGN AND SITE-DEVELOPMENT PROGRAM IN AN AQUIFER. VOLUME 1: EXECUTIVE SUMMARY Final Report

Jun. 1982 129 p Sponsored by Electric Power Research Inst.
Prepared in cooperation with Sargent and Lundy Engineers, Chicago and Westinghouse Electric Corp., Concordville, Pa. 9 Vol.
(Contract DE-AC02-78ET-29232; EPRI PROJ. 1081-3)
(DE82-019284; EPRI-EM-2351-VOL-1) Avail: NTIS HC A07/MF A01

The behavior and suitability of an aquifer-based compressed-air energy storage (CAES) facility was investigated. Project organization, site selection, aquifer geology, plant design, turbomachinery, and cost analysis are addressed. DOE

N83-13611# Public Service Co. of Indiana, Plainfield.
COMPRESSED-AIR ENERGY STORAGE PRELIMINARY DESIGN AND SITE-DEVELOPMENT PROGRAM IN AN AQUIFER. VOLUME 2: UTILITY-SYSTEM PLANNING Final report

Jun. 1982 111 p refs
(Contract DE-AC02-78ET-29232; ET-78-C-01-2159; EPRI PROJ. 1081-3)
(DE82-019993; EPRI-EM-2351-VOL-2) Avail: NTIS HC A06/MF A01

The benefits derived from the integration of a compressed air energy storage facility with a hypothetical electrical network were analyzed. The analysis was based on three study scenarios each having a target generation mix of 65% base, 25% intermediate, and 10% peaking capacity. Scenarios of 100% coal, 50% coal and 50% nuclear, and 100% nuclear base load capacity additions were examined. Final results of the analyses indicate favorable economics when compressed air energy storage is installed as an alternative to combustion turbine peaking capacity on a system with a significant amount of oil-fired generation. DOE

N83-13612# Gould, Inc., Rolling Meadows, Ill.
DEVELOPMENT OF ZINC BROMIDE BATTERIES FOR STATIONARY ENERGY STORAGE Final Report, Nov. 1979 - Dec. 1981

R. A. PUTT and A. ATTIA Jul. 1982 114 p Sponsored by Electric Power Research Inst.
(Contract DE-AC02-78ET-29345; EPRI PROJ. 635-2)
(DE82-019283; EPRI-EM-2497) Avail: NTIS HC A06/MF A01

The principal objective was to build and test for 50 cycles a 10-kWh, 80-kWh prototype battery of the bipolar design with large electrodes (30 cm x 30 cm). Secondary objectives were to continue long-term studies on improvements in materials and processing and on life cycling of small laboratory cells. Secondary objectives were to continue long-term studies on improvements in materials and processing and on life cycling of small laboratory cells. The 80-kWh design was successfully constructed and tested, running 59 consecutive cycles from its first startup. The forced outage rate was zero, and the total downtime for repair and maintenance was 9.6 hours out of the 1728 elapsed-time hours. The system was operated at full power, but not at full capacity (design levels of 10 kW for 8 h). Energy efficiency was above 60% in the early cycles. The present design is the first of its kind and far from having optimum characteristics of the most suitable materials. Achievements of 70 to 75% electrochemical energy efficiency is believed to be feasible. DOE

N83-13618# Science Applications, Inc., Palo Alto, Calif.
COMPUTER-SIMULATION CODE FOR THE PREDICTION OF RELIABILITY AND AVAILABLE CAPACITY OF MODULAR ENERGY-STORAGE ARRAYS. VOLUME 1: OVERVIEW Final Report

S. L. BASIN and R. D. HORN Aug. 1982 37 p Sponsored by Electric Power Research Inst. 2 Vol.
(Contract EPRI PROJ. 370-17)
(DE82-906445; EPRI-EM-2486-VOL-1) Avail: NTIS HC A03/MF A01

This report describes a computer simulation code that has been constructed for studying the reliability of arrays of energy storage components which are subject to renewal or repair. The measures of performance include: time to first failure of the array, time between successive failures, available capacity of the system (i.e., number of module hours available) between successive system failures as well as over the planned life of the system; number of system failures over the planned life of the systems; and number of module replacements over the planned life of the systems. At the present time the program is set up to handle two types of systems; simple systems consisting of series-parallel or parallel-series configurations of modules and compound systems in which the modules in the overall system array have been replaced by submodules, each having a series-parallel or parallel-series structure. The effect of periodic maintenance - e.g., the replacement of all failed modules every three or six months - may be studied in contrast to replacement of all failed modules at

the time of each system failure. The program allows for the combination of both of the above maintenance policies. It is assumed that all failed modules or submodules within the system are replaced by new ones. DOE

N83-13627# United Kingdom Atomic Energy Authority, Harwell (England).

SECONDARY BATTERY REQUIREMENTS FOR SPACE USE IN THE LATE 1980'S 1990'S Final Report

J. HYATT Paris ESA Apr. 1982 274 p refs

(Contract ESTEC-4404/80/NL-JS(SC))

(HL82/1200; ESA-CR(P)-1637) Avail. NTIS HC A12/MF A01

Secondary batteries, reversible fuel cells and energy storage wheels were assessed. It is found that there is no system being developed for terrestrial applications that offers any potential to the space user, in low Earth orbits, better than the nickel/hydrogen and silver/hydrogen cells being developed specifically for space. The advanced high temperature cells (the sodium/sulfur cells in particular) do offer potential for development to give a lighter battery in geosynchronous Earth orbit. Author (ESA)

N83-13634# National Materials Advisory Board, Washington, D. C.

ASSESSMENT OF RESEARCH NEEDS FOR ADVANCED BATTERY SYSTEMS Final Report

May 1982 197 p refs

(Contract DOE-ET-78-C-01-3431)

(PB82-227349, NMAB-390) Avail. NTIS HC A09/MF A01

CSCS 10C

The materials related research needs for advanced rechargeable storage battery systems were assessed. Both aqueous and nonaqueous systems, to be used primarily in electric vehicles and electric utility load leveling applications, were examined. It is concluded that research is needed on a wide spectrum of components and processes to improve the performance of such systems. Additionally, many of the problems are common to several types of battery cells; research on these generic problems warrants special priority. An overview of the state of the art is provided along with a summary of recommendations, particularly concerning generic problems with storage batteries but also including those unique to individual systems. An outline of research needs is presented. GRA

N83-13635# Swedish Council for Building Research, Stockholm.
SEASONAL THERMAL STORAGE: SWEDISH PRACTICE, DEVELOPMENTS AND COST PROJECTIONS

P. MARGEN 1981 33 p refs

(PB82-232331; D4:1981) Avail. NTIS HC A03/MF A01 CSCS 10C

The types of heat store being developed in Sweden for seasonal storage of heat are discussed. This type of storage allows summer excess heat from industrial waste heat plants, garbage burning plants and future central solar heat stations to be stored for winter use on district heating networks. Whereas above ground steel or concrete tanks are usually too expensive insulated earth pits, uninsulated rock caverns and deep ground schemes using rock or clay promise to achieve sufficiently low costs to justify storage when supplied with free or cheap summer heat. For all these concepts demonstration plants were or are being built in Sweden. GRA

N83-13637# Maschinenfabrik Augsburg-Nürnberg A.G., Munich (West Germany).

STATIONARY FLYWHEEL ENERGY STORAGE SYSTEMS

A. GILHAUS, E. HAU, G. GASSNER, G. HUSS, and H. SCHAUBERGER Jul. 1982 111 p refs Transl. into ENGLISH from the mono. "Stationäre Schwungrad-Energiespeicher" 1981 Sponsored in part by the Commission of the European Communities

(PB82-238130; EUR-7088-DE) Avail. NTIS HC A06/MF A01 CSCS 131

A study intended to discover industrial applications of Stationary Flywheel Energy Accumulators. The economic value for the

consumer and the effects on the power supply grid were investigated. A possibility for energy storage by flywheels exists where energy otherwise lost can be used effectively as in brake energy storage in vehicles. The future use of flywheels in wind power plants also seems to be promising. Attractive savings of energy can be obtained by introducing modern flywheel technology for emergency power supply units which are employed, for instance, in telecommunication systems. GRA

N83-14414# Los Alamos Scientific Lab., N. Mex.

THE 30-MJ SUPERCONDUCTING MAGNETIC ENERGY STORAGE FOR BPA TRANSMISSION-LINE STABILIZER

R. I. SCHERMER 1981 20 p refs Presented at US-Japan Superconductive Magnetic Energy Storage Workshop, Madison, Wis., 19 Oct. 1981

(Contract W-7405-ENG-36)

(DE82-002355; LA-UR-81-3040; CONF-811051-2) Avail. NTIS HC A02/MF A01

The development of a 30 MJ (8.4 kWh) superconducting magnetic energy storage (SMES) unit with a 10 MW converter which can provide system damping for low frequency oscillations is described. The coil is complete and all major components of the electrical and cryogenic systems were received and are tested. Computer control hardware is in place and software development is proceeding. Support system components and dewar lid are fabricated and foundation design is complete. GRA

N83-14662 Minnesota Univ., Minneapolis.

DESIGN OF PLYWOOD AND PAPER FLYWHEEL ROTORS Ph.D. Thesis

D. L. HAGEN 1982 197 p

Avail. Univ. Microfilms Order No. DA8221276

Technical and economic design factors of cellulosic rotors are compared with conventional materials for stationary flywheel energy storage systems. Wood species, operation in a vacuum, assembly and costs of plywood rotors are evaluated. Wound kraft paper, twine and veneer rotors are examined. Two bulb attachments are designed. Support stiffness is shown to be constrained by the material strength, rotor configuration and speed ratio. Plywood moisture equilibrium during manufacture and assembly is critical. Disk shaping and rotor assembly are described. Potential self-centering dynamic balancing methods and equipment are described. Detailed measurements of the distribution of strengths, densities and specific energy of conventional Finnish Birch plywood and of custom made hexagonal Birch plywood are detailed. High resolution tensile tests were performed while monitoring the acoustic emissions with microprocessor controlled data acquisition. Preliminary duration of load tests were performed on vacuum dried hexagonal birch plywood. Economics of cellulosic and conventional rotors were examined. Dissert. Abstr.

N83-14667# Case Western Reserve Univ., Cleveland, Ohio.

ELECTROMAGNETIC STUDIES OF REDOX SYSTEMS FOR ENERGY STORAGE Annual Report, Dec. 1981 - Nov. 1982

C. D. WU, D. SCHERSON, and E. YEAGER Nov. 1981 69 p refs

(Contract NAG3-219)

(NASA-CR-169593; NAS 1.26.169593; REPT-2) Avail. NTIS HC A04/MF A01 CSCS 10C

Both chromium and iron couples were studied on various electrode surfaces in acidic perchlorate solution by using rotating ring-disk techniques. It was found that chloride which forms inner sphere coordination complexes with the redox species enhances the electrode kinetics dramatically. The effects of lead underpotential deposition and surface alloy formation on the kinetics of the chromium couple on gold were studied using both linear sweep voltammetry and potential step techniques. The lead underpotential deposition was found to slow down the kinetics of the reduction of the Cr species on gold surfaces although increase the hydrogen overvoltage. The effect on the chromium kinetics can be explained in terms of principally a double layer effect. The underpotential deposition lead species with its positive charge results in a decrease in the concentration of the Cr species at

07 ENERGY STORAGE

the electrode surface. Similar phenomena were also observed with bismuth underpotential deposition on gold for the iron couple.

R.J.F.

N83-14683* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

THE NASA REDOX STORAGE SYSTEM DEVELOPMENT PROJECT, 1980

Dec. 1982 73 p refs
(Contract DE-AI04-80AL-12726)

(NASA-TM-82940; E-1340; DOE/NASA/12726-18; NAS 1.15:82940) Avail: NTIS HC A04/MF A01 CSCL 10C

The technical accomplishments pertaining to the development of Redox systems and related technology are outlined in terms of the task elements: prototype systems development, application analyses, and supporting technology. Prototype systems development provides for a major procurement to develop an industrial capability to take the current NASA Lewis technology and go on to the design, development, and commercialization of iron-chromium Redox storage systems. Application analyses provides for the definition of application concepts and technology requirements, specific definition studies, and the identification of market sectors and their penetration potential. Supporting technology includes both in house and contractual efforts that encompass implementation of technology improvements in membranes, electrodes, reactant processing, and system design. The status of all elements is discussed.

J.M.S.

N83-14742* EIC, Inc., Newton, Mass.

AMBIENT TEMPERATURE RECHARGEABLE LITHIUM BATTERY Final Report, 1 Mar. 1981 - 28 Feb. 1982

K. M. ABRAHAM, D. I. NATWIG, P. B. HARRIS, and J. W. AVERY Fort Belvoir, Va. Army Electronics Research and Development Command Aug. 1982 102 p refs
(Contract DAAK20-81-C-0378; DA PROJ. 1L1-62705-AH-94) (AD-A119297; C-655; DELET-TR-81-0378-F) Avail: NTIS HC A06/MF A01 CSCL 10C

Cr_{0.5}V_{0.5}S₂ has been characterized as a useful positive electrode material for rechargeable Li cells. The positive electrode reaction involves intercalation of Li during discharge and deintercalation of Li during recharge. A discharge capacity equivalent to nearly 1e-/Cr_{0.5}V_{0.5}S₂ has been obtained in early cycles at low rates. The average capacity which could be realized in long-term cycling appears to be 0.7-0.8e-/Cr_{0.5}V_{0.5}S₂. Laboratory cells exceeded 200 deep discharge cycles. Although Cr_{0.5}V_{0.5}S₂ and its Li intercalates are good electronic conductors, optimum rate and rechargeability were found in electrodes with 15-20 weight percent carbon. Because of this relatively large amount of carbon, the volumetric energy density achieved in cells has been significantly lower than what was anticipated at the outset of the program. The major objective of the program, development of a technology base for the construction of large rechargeable Li cells, has been accomplished. Cells with theoretical capacities of 10 and 20 Ah have been constructed and tested. In limited cycle tests, these large cells performed as well as laboratory test cells.

GRA

N83-14743* Naval Surface Weapons Center, White Oak, Md. Research and Technology Dept.

DEVELOPMENT OF IMPROVED SEPARATORS FOR ALKALINE ZINC BATTERIES Final Report

W. A. PARKHURST 28 Feb. 1982 18 p refs
(Contract SF43431302)

(AD-A119150; AD-F500064; NSWC/TR-82-128) Avail: NTIS HC A02/MF A01 CSCL 10C

This report is a summary of the development of separator materials for rechargeable alkaline zinc batteries over a seven year period. It summarizes studies performed during the earlier years of polyphenylquinoxaline (PPQ) polymer blends as separator materials. The expense of large scale production and the marginal improvement demonstrated for PPQ blends over existing cellulose based separator materials led to redirection of the work. The current limited effort in the development of nickel coated separator

materials is described. Because of a lack of funding, the characterization of nickel coated separator materials was not completed. Further characterization, testing and evaluation of the feasibility of such electrically conductive separator film materials is recommended.

GRA

N83-14748* Oak Ridge National Lab., Tenn.

INDUSTRIAL THERMAL ENERGY STORAGE: WHAT ARE THE POSSIBILITIES?

M. OLSZEWSKI 1981 23 p refs Presented at Intern. Flame Res. Assoc. Meeting, Chicago, 5 Oct. 1981
(Contract W-7405-ENG-26)

(DE82-001494; CONF-811058-1) Avail: NTIS HC A02/MF A01

Some of the identified applications for thermal energy storage (TES) in the industrial sector are presented. The TES is generally applicable in reject energy recovery and reuse systems where either the energy source or use exhibits a fluctuating pattern of availability or need. It is also applicable when a mismatch occurs between the time that the heat is available and the time it is needed.

DOE

N83-14749* Los Alamos Scientific Lab., N. Mex.

DESIGN AND TESTING OF A 13.75 MW CONVERTER FOR A SUPERCONDUCTING MAGNETIC-ENERGY-STORAGE SYSTEM

H. J. BOENIG, R. D. TURNER, C. L. NEFT, and K. H. SUEKER 1981 5 p refs Presented at the 9th Symp. on Engr. of Fusion Res., Chicago, 26-29 Oct. 1981

(Contract W-7405-ENG-36)

(DE82-002385; LA-UR-81-3132; CONF-811040-70) Avail: NTIS HC A02/MF A01

A 30 MJ superconducting magnetic energy storage system to act as a transmission line stabilizer is described. Two 6 MVA transformers and a 5.5 kA, + 2.5 kV converter connects the superconducting coil to the 13.8 kV bus and regulates the power flow between the coil and the three phase system. The design philosophy for the converter including its control and protection system is given. The converter was tested with 10% overvoltage at no load, with 10% overcurrent at zero output voltage and with a watercooled resistive load of about 1 MW. These test results show that the converter meets the expected full load operating conditions.

DOE

N83-14754* Pacific Northwest Lab., Richland, Wash.

AQUIFER STABILITY INVESTIGATION

R. D. ALLEN and T. J. DOHERTY Sep. 1981 18 p refs Presented at Compressed Air Energy Storage Seminar, Chicago, 17 Sep. 1981

(Contract DE-AC06-76RL-01830)

(DE82-003831; PNL-9884; CONF-810997-2) Avail: NTIS HC A02/MF A01

The reservoir Stability Studies Program had four major activities: a state-of-the-art survey to establish preliminary stability criteria and identify areas requiring research and development; numerical modeling; laboratory testing to provide data for use in numerical models and to investigate fundamental rock mechanics, thermal, fluid, and geochemical response of aquifer materials; and field studies to verify the feasibility of air injection and recovery under CAES conditions in an aquifer, to validate and refine the stability criteria, and to evaluate the accuracy and adequacy of the numerical and experimental methodologies developed in previous work. Three phases of study, including preliminary criteria formulation, numerical model development, and experimental assessment of CAES reservoir materials have been completed. Present activity consists of construction and operation of the aquifer field test, and associated numerical and experimental work in support of that activity.

DOE

N83-14755# Pacific Northwest Lab., Richland, Wash.
ADVANCED CONCEPTS: THE SECOND GENERATION OF COMPRESSED AIR-ENERGY STORAGE TECHNOLOGY
 L. D. KANNBERG Sep. 1981 12 p refs Presented at Compressed Air Energy Storage Seminar, Chicago, 17 Sep. 1981 (Contract DE-AC06-76RL-01830) (DE82-003838; PNL-SA-9885; CONF-810997-1) Avail: NTIS HC A02/MF A01

A description and assessment is provided for four second generation compressed air energy storage (CAES) concepts; adiabatic CAES, hybrid CAES, CAES with coal gasification (CG), and CAES with pressurized fluidized bed combustion (PFBC). These are based on information provided in conceptual design studies performed by Acres American, Inc., United Engineers and Constructors, and United Technologies Research Center. The assessment covers consideration of the technological readiness, relative economic benefits and operational viability of each concept. It was concluded that the adiabatic CAES concept appears to be the most attractive candidate for utility application in the near future. It is operationally viable, economically attractive compared with competing concepts, and will require relatively little additional development before commercialization. It was estimated that a utility could start the design of a commercial plant in 2 to 3 years if research regarding TES system design is undertaken in a timely manner. DOE

N83-14758# Pacific Northwest Lab., Richland, Wash.
ECONOMIC COMPARISON OF CAES DESIGNS EMPLOYING HARDROCK, SALT AND AQUIFER STORAGE RESERVOIRS
 R. W. REILLY and R. B. SCHAIKNER (Electric Power Research Inst.) 1981 9 p refs Presented at the Compressed Air Energy Storage Seminar, Chicago, 17 Sep. 1981 (Contract DE-AC06-76RL-01830) (DE82-003833; PNL-SA-9890; CONF-810997-3) Avail: NTIS HC A02/MF A01

The economic performance of three compressed air energy storage (CAES) designs is briefly examined. Each design was developed under different assumptions and constraints, and each employed a different type of air storage facility: a hardrock-mined cavity, a solution mined salt deposit, and an aquifer. The results indicate that aquifer and salt storage facilities cost roughly 60 to 70% of the equivalent hardrock mined cavern. In this comparison the aquifer storage facility was somewhat less expensive than the salt cavity, but this difference could be reversed with different salt and/or aquifer characteristics. For instance, if the aquifer was less permeable, then more wells would be required for the same power level, and total storage cost would be higher. The major difference between the plant cost estimates lies not in the cost of storage facilities, but rather in vendor estimates of turbomachinery cost. And, since turbomachinery contributes about half of total plant cost, this difference could be critical to the decision to build a CAES plant. DOE

N83-14759# Sandia Labs, Albuquerque, N. Mex.
PARAMETRIC BEHAVIOR OF THE CIRCULATING ZINC-BROMINE BATTERY
 E. KANTNER, R. BELLOWES, H. EINSTEIN, P. GRIMES, P. MALACHESKY, and K. NEWBY 1981 17 p refs Presented at Electrochem. Soc. General Session, Pennington, N. J., 11 Oct. 1981 (Contract DE-AC04-76DP-00789) (DE82-001910; SAND-81-7158C; CONF-811084-1) Avail: NTIS HC A02/MF A01

Graphs are presented depicting polarization data of bipolar batteries of varying capacity ratings, battery voltage vs c/d time of bipolar batteries of varying capacity ratings. Coulomb efficiency vs zinc loading, Coulomb efficiency vs c/d rate, voltage efficiency vs c/d rate, and energy efficiency vs c/d rate. DOE

N83-15169*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
RESEARCH AND TECHNOLOGY, LEWIS RESEARCH CENTER Annual Report, 1982
 1982 47 p refs
 (NASA-TM-83038, NAS 1.15:83038) Avail: NTIS HC A03/MF A01 CSCL 05B

Aeronautics, space, and terrestrial energy research is covered. Energy conversion processes and systems for propulsion in the atmosphere, in space, and on the ground are reviewed. Electric energy generation and storage for both terrestrial and space applications and materials and structures for such systems are also reviewed. N.W.

N83-15372*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
DEVELOPMENT AND EVALUATION OF POLYVINYL-ALCOHOL BLEND POLYMER FILMS AS BATTERY SEPARATORS
 M. A. MANZO Dec. 1982 25 p refs
 (NASA-TM-82981; E-1412; NAS 1.15:82981) Avail: NTIS HC A02/MF A01 CSCL 10C

Several dialdehydes and epoxies were evaluated for their suitability as cross-linkers. Optimum concentrations of several cross-linking reagents were determined. A two-step method of cross-linking, which involves treatment of the film in an acid or acid peroxide bath, was investigated and dropped in favor of a one-step method in which the acid catalyst, which initiates cross-linking, is added to the PVA - cross-linker solution before casting. The cross-linking was thus achieved during the drying step. This one-step method was much more adaptable to commercial processing. Cross-linked films were characterized as alkaline battery separators. Films were prepared in the lab and tested in cells in order to evaluate the effect of film composition and a number of processing parameters on cell performance. These tests were conducted in order to provide a broader data base from which to select optimum processing parameters. Results of the separator screening tests and the cell tests are discussed. M.G.

N83-15587# Los Alamos Scientific Lab., N. Mex.
HIGH-CURRENT PULSES FROM INDUCTIVE ENERGY STORES
 S. L. WIPF 1981 7 p refs Presented at the 9th Symp. on Eng. Probl. of Fusion Res., Chicago, 26-29 Oct. 1981 (Contract W-7405-ENG-36) (DE82-004366; LA-UR-81-3421; CONF-811040-119) Avail: NTIS HC A02/MF A01

Superconducting inductive energy stores can be used for high power pulse supplies if a suitable current multiplication scheme is used. The concept of an inductive Marx generator is superior to a transformer. A third scheme, a variable flux linkage device, is suggested; in multiplying current it also compresses energy. Its function is in many ways analogous to that of a horsewhip. Superconductor limits indicate that peak power levels of TW can be reached for stored energies above 1 MJ. DOE

N83-15845# United Technologies Corp., East Hartford, Conn.
ALKALINE FUEL CELLS FOR PRIME POWER AND ENERGY STORAGE
 J. K. STEDMAN In R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 1 42 p 1982
 Avail: NTIS HC A99/MF A01 CSCL 10A

Alkaline fuel cell technology and its application to future space missions requiring high power and energy storage are discussed. Energy densities exceeding 100 watt-hours per pound and power densities approaching 0.5 pounds per kilowatt are calculated for advanced systems. Materials research to allow reversible operation of cells for energy storage and higher temperature operation for peaking power is warranted. Author

07 ENERGY STORAGE

N83-15943# Oak Ridge National Lab, Tenn Engineering Technology Div

THE ORNL THERMAL ENERGY STORAGE PROGRAM: TECHNICAL SUPPORT

R N. MCGILL 1981 17 p refs Presented at the Ann Thermal and Chem Storage Contractors' Rev Meeting, Washington, D.C., 14-16 Sep 1981 2 Vol (Contract W-7405-ENG-26)

(DE81-030805; CONF-810940-8) Avail NTIS HC A02/MF A01

The three major elements of the technology development program of the Oak Ridge National Laboratory are discussed. Computer modeling and bench scale experiments of phase change materials, the Thermal Energy Storage Test Facility, and earth thermal storage-assisted heat pump studies are discussed. Each of these program elements are discussed with regard to their objectives and the progress of each during the past year. Also, indications of the direction that each project is taking and the progress anticipated for next year are given. DOE

N83-15944# Oak Ridge National Lab, Tenn Energy Technology Div

THE ORNL THERMAL ENERGY STORAGE PROGRAM

J F MARTIN 1981 15 p refs Presented at Thermal Energy Storage Ann Contractors' Rev Meeting, Washington, D.C., 14-16 Sep 1981 2 Vol (Contract W-7405-ENG-26)

(DE81-032001; CONF-810940-9) Avail NTIS HC A02/MF A01

Development of thermal energy storage technologies and subsystems is discussed. Oak Ridge National Laboratory activities in the areas of building heating and cooling and industrial applications are discussed. Specific subcontract and in-house activities are summarized and the results of research conducted during FY 1981 are given. The major thrust of next year's program is given. DOE

N83-15945# Institute of Gas Technology, Chicago, Ill **ADVANCED HIGH-TEMPERATURE THERMAL ENERGY STORAGE MEDIA FOR INDUSTRIAL APPLICATIONS**

T. D. CLEAR and R. T. WEIBEL 1981 7 p refs Presented at the ANN. Contractors' Rev Meeting on Thermal and Chem Storage, Tysons Corner, Va., 16 Sep 1981 (Contract W-7405-ENG-26)

(DE82-000161; CONF-810940-16) Avail NTIS HC A02/MF A01

An advanced thermal energy storage (TES) media concept based on use of carbonate salt/ceramic composite materials is being developed for industrial process and reject heat applications. This paper describes the composite latent/sensible media concept and its potential advantages over state-of-the-art latent heat systems. Media stability requirements, on-going materials development efforts and planned TES performance evaluation tests are discussed. DOE

N83-15946# New Mexico Univ., Albuquerque Dept of Mechanical Engineering.

PERFORMANCE OF LABYRINTH-STRATIFIED WATER-STORAGE SYSTEM FOR HEATING AND COOLING

M. W. WILDIN 1981 9 p refs Presented at the Ann. Contractors' Rev Meeting on Thermal and Chem. Storage, Tysons Corner, Va., 16 Sep 1981 (Contract W-7405-ENG-26)

(DE82-000107; CONF-810940-11) Avail: NTIS HC A02/MF A01

The performance of a set of thermal storage tanks using water as the storage medium and the labyrinth technique to help maintain separation of warmer and cooler water was monitored during most of the 1980-81 heating season and is being monitored during the 1981 cooling season. The results indicate the effectiveness of this technique for leveling of the power drawn from a utility. They also indicate the potential for energy conservation via heat recovery during the heating season. The scheme was incorporated in thermal storage tanks constructed for the Mechanical Engineering Building at the University of New Mexico. DOE

N83-15947# North Carolina State Univ, Raleigh Dept of Materials Science

EVALUATION OF OLIVINE CERAMIC REFRACTORIES FOR THERMAL-ENERGY-STORAGE APPLICATION

H PALMOUR, B M GAY, and R L COCHRAN 1981 7 p Presented at the Ann Contractors' Rev Meeting on Thermal and Chem Storage, Tysons Corner, Va., 16 Sep 1981 (Contract W-7405-ENG-26)

(DE82-000108; CONF-810940-27) Avail. NTIS HC A02/MF A01

The degree of improvement in thermal and mechanical performance that can be obtained with an olivine thermal storage brick made of domestic materials using advanced processing techniques compared with state-of-the-art as represented by commercial European bricks is discussed. The goals and results of the study are given. DOE

N83-15948# Purdue Univ., Lafayette, Ind School of Mechanical Engineering.

THERMAL ENERGY STORAGE TESTING FACILITIES

R J SCHOENHALS, S H ANDERSON, L W STEVENS, W. R. LASTER, and M R ELTER 1981 7 p refs Presented at the Ann Contractors Rev Meeting on Thermal and Chem. Storage, Tysons Corner, Va., 14-16 Sep 1981 (Contract W-7405-ENG-26)

(DE82-000110; CONF-810940-24) Avail NTIS HC A02/MF A01

Development of a prototype testing facility for performance evaluation of electrically heated thermal energy storage units is discussed. Laboratory apparatus and test procedures are being evaluated by means of measurements and analysis. Testing procedures were improved, and test results were acquired for commercially available units. A 30 kW central unit and several smaller individual room-size units were tested. DOE

N83-15949# Argonne National Lab, Ill **FIELD EVALUATION AND ASSESSMENT OF THERMAL ENERGY STORAGE FOR RESIDENTIAL SPACE HEATING**

H. N. HERSH 1981 6 p refs Presented at Ann Contractors' Rev. Meeting on Thermal and Chem. Storage, Washington, D.C., 14-16 Sep 1981 (Contract W-7405-ENG-26)

(DE82-000164; CONF-810940-23) Avail NTIS HC A02/MF A01

Based on New England field test data covering two heating seasons, thermal energy storage (TES) is technically viable and acceptable to its users. An analysis is underway comparing the efficiency of electricity utilization of direct and storage heating systems. Economics (higher cost of TES systems and changes in rate structures) represents the largest impediment to sufficient market penetration. DOE

N83-15950# Oak Ridge National Lab, Tenn.

MATHEMATICAL MODELING OF TES SUBSYSTEMS

A D. SOLOMON 1981 5 p refs Presented at Ann Contractors' Rev Meeting on Thermal and Chem Storage, Washington, D.C., 14-16 Sep 1981 (Contract W-7405-ENG-26)

(DE82-000168; CONF-810940-21) Avail: NTIS HC A02/MF A01

Results of research into phase change models for latent heat storage are described. These are of both a simulation and analytical nature and continue the work of past years in this effort. A simulation code for the cooling and dehumidification of an air stream due to phase change material cylinders is discussed. The development of a bogus specific heat for phase change calculations is discussed. DOE

N83-15956# Oak Ridge National Lab., Tenn.
ONCE-THROUGH HEAT TRANSPORT AND SEASONAL STORAGE FOR CITY OF BELLINGHAM

I. OLKER (Burns and Roe, Inc., Oradell, N. J.) and M OLSZEWSKI 1981 12 p refs Presented at Intern. Energy Storage Conf., Seattle, Wash., 19 Oct. 1981 (Contract W-7405-ENG-26)

(DE82-001501; CONF-811066-1) Avail: NTIS HC A02/MF A01

A conceptual design of a once-through district heating system utilizing industrial waste heat was developed for the city of Bellingham, Washington. Two once-through designs are evaluated. Case 1 is based on an assumption that 67 MWt can be obtained from an aluminum plant and supplementary heat sources and does not require a seasonal thermal storage facility. Case 2 is based on the extraction of 45 MWt from the aluminum plant and requires a seasonal thermal storage facility. These once-through systems were compared with the closed district heating system design which uses a two-pipe heat transport arrangement that returns the used water to the aluminum plant. In 1980 dollars, once through system case 1 would provide an economic advantage of about \$10.7 million over the closed system. Case 2 would incur a disadvantage of about \$9.1 million in comparison with the closed system, largely because of the high cost of seasonal thermal storage tanks. DOE

N83-15957# Energy Utilization Systems, Inc., Pittsburgh, Pa
SURVEY OF UTILITY LOAD MANAGEMENT PROJECTS: THIRD REVISED REPORT

Oct. 1981 342 p refs

(Contract W-7405-ENG-26)

(DE82-000888; ORNL/SUB-80-13644-1) Avail: NTIS HC A15/MF A01

The 86 utility sponsored thermal energy storage (TES) projects and 158 communication and load control (C&CL) projects are described. These projects are grouped into two main sections (TES and C&CL) and into several subsections, according to the type of TES or C&CL system or device utilized. Each subsection contains a technical description of the particular system or device, a discussion of installed costs, if such information is available, and a listing of the manufacturer(s) of the hardware. A comprehensive table of all utility projects that involve the use of this hardware is presented. Additional information on selected projects in expanded summary forms is presented. These projects were selected based on their uniqueness, scope, maturity, results or because they are representative of utility projects utilizing similar hardware. GRA

N83-16257*# Gould, Inc., Rolling Meadows, Ill
IMPROVED SCR AC MOTOR CONTROLLER FOR BATTERY POWERED URBAN ELECTRIC VEHICLES Final Report

T. S. LATOS Dec 1982 319 p refs

(Contract DEN3-60; DE-AI01-77CS-51044)

(NASA-CR-167919; DOE/NASA/0060-82/1, NAS 1.26.167919, REPT-815-008) Avail: NTIS HC A14/MF A01 CSCL 13F

An improved ac motor controller, which when coupled to a standard ac induction motor and a dc propulsion battery would provide a complete electric vehicle power train with the exception of the mechanical transmission and drive wheels was designed. In such a system, the motor controller converts the dc electrical power available at the battery terminals to ac electrical power for the induction motor in response to the drivers commands. The performance requirements of a hypothetical electric vehicle with an upper weight bound of 1590 kg (3500 lb) were used to determine the power rating of the controller. Vehicle acceleration capability, top speed, and gradeability requisites were contained in the Society of Automotive Engineers (SAE) Schedule 227a(d) driving cycle. The important capabilities contained in this driving cycle are a vehicle acceleration requirement of 0 to 72.4 kmph (0 to 45 mph) in 28 seconds a top speed of 88.5 kmph (55 mph), and the ability to negotiate a 10% grade at 48 kmph (30 mph). A 10% grade is defined as one foot of vertical rise per 10 feet of horizontal distance. S L

08

GENERAL

A83-17115

ADVANCES IN ENERGY TECHNOLOGY; PROCEEDINGS OF THE EIGHTH ANNUAL UMR-DNR CONFERENCE ON ENERGY, UNIVERSITY OF MISSOURI-ROLLA, ROLLA, MO, NOVEMBER 4-7, 1981

H. J. SAUER, JR., (ED.) and B. E. HEGLER Conference sponsored by the University of Missouri-Rolla and Missouri Department of Natural Resources Rolla, MO, University of Missouri-Rolla, 1982 332 p

Papers on various topics of energy conservation, new passive solar heating and storage devices, governmental participation in developing energy technologies, and the development of diverse energy sources and safety features are presented. Attention is given to recent shifts in the federal and state government roles in energy research, development and economic incentives. The applications of passive solar walls, flat plate collectors and trombe walls as retrofits for houses, institutions, and industries were examined. Attention was given to the implementation of wind power by a zoo and the use of spoilers as speed control devices in a Darrieus wind turbine. Aspects of gasohol, coal, synfuel, and laser-pyrolyzed coal products use are investigated. Finally, the economic, social, and political factors influencing energy system selection are explored, together with conservation practices in housing, government, and industry, and new simulators for enhancing nuclear power plant safety. M S K

A83-17701

HEAT TRANSFER - A REVIEW OF 1981 LITERATURE

E. R. G. ECKERT, R. J. GOLDSTEIN, S. V. PATANKAR, E. PFENDER, J. W. RAMSEY, T. W. SIMON, and E. M. SPARROW (Minnesota, University, Minneapolis, MN) International Journal of Heat and Mass Transfer, vol. 25, Dec 1982, p. 1783-1812. refs

Results that have been published in the open literature covering various fields of heat transfer during 1981 are surveyed. Preliminarily, developments in the field during 1981 are summarized. The subjects reviewed in detail include conduction, channel flow, boundary layer and external flows, flow with separated regions, internal and external flows in natural convection, convection from rotating surfaces, combined heat and mass transfer, change of phase, radiation in participating media, surface radiation, MHD, numerical methods, heat exchangers and gas pipes, general heat transfer applications, solar energy, and plasma heat transfer. An extensive list of references is included. C D.

A83-18581*# National Aeronautics and Space Administration, Wallops Flight Center, Wallops Island, Va
EXPERIMENTAL FEASIBILITY OF THE AIRBORNE MEASUREMENT OF ABSOLUTE OIL FLUORESCENCE SPECTRAL CONVERSION EFFICIENCY

F. E. HOGE (NASA, Wallops Flight Center, Wallops Island, VA) and R. N. SWIFT (EG & G Washington Analytical Services Center, Inc., Pocomoke City, MD) Applied Optics, vol. 22, Jan. 1, 1983, p. 37-47 refs

Airborne lidar oil spill experiments carried out to determine the practicability of the AOFSC (absolute oil fluorescence spectral conversion efficiency) computational model are described. The results reveal that the model is suitable over a considerable range of oil film thicknesses provided the fluorescence efficiency of the oil does not approach the minimum detection sensitivity limitations of the lidar system. Separate airborne lidar experiments to demonstrate measurement of the water column Raman conversion efficiency are also conducted to ascertain the ultimate feasibility of converting such relative oil fluorescence to absolute values. Whereas the AOFSC model is seen as highly promising, further airborne water column Raman conversion efficiency experiments with improved temporal or depth-resolved waveform calibration

08 GENERAL

and software deconvolution techniques are thought necessary for a final determination of suitability. C R

N83-10379*# Hughes Aircraft Co., Torrance, Calif Electron Dynamics Div
FABRICATION AND DEVELOPMENT OF SEVERAL HEAT PIPE HONEYCOMB SANDWICH PANEL CONCEPTS Final Report
H. J. TANZER Jun 1982 55 p refs
(Contract NAS1-16556)
(NASA-CR-165962, NAS 1.26.165962) Avail. NTIS HC A04/MF A01 CSCL 20D

The feasibility of fabricating and processing liquid metal heat pipes in a low mass honeycomb sandwich panel configuration for application on the NASA Langley airframe-integrated Scramjet engine was investigated. A variety of honeycomb panel facesheet and core-ribbon wick concepts was evaluated within constraints dictated by existing manufacturing technology and equipment. The chosen design consists of an all-stainless steel structure, sintered screen facesheets, and two types of core-ribbon; a diffusion bonded wire mesh and a foil-screen composite. Cleaning, fluid charging, processing, and process port sealing techniques were established. The liquid metals potassium, sodium and cesium were used as working fluids. Eleven honeycomb panels 15.24 cm X 15.24 cm X 2.94 cm were delivered to NASA Langley for extensive performance testing and evaluation, nine panels were processed as heat pipes, and two panels were left unprocessed. Author

N83-11794# Army Construction Engineering Research Lab., Champaign, Ill. Facilities Systems Div
CAEADS: COMPUTER-AIDED ENGINEERING AND ARCHITECTURAL DESIGN SYSTEM Final Report
J. H. SPOONAMORE Aug. 1982 23 p refs Presented at the Army Sci. Conf., West Point, N.Y., 15-18 Jun 1982
(Contract DA PROJ 4A7-62731-AT-41)
(AD-A117972, CERL-TM-P-133) Avail. NTIS HC A02/MF A01 CSCL 09B

The U.S. Army Corps of Engineers Construction Engineering Research Laboratory is developing the Computer-Aided Engineering and Architectural Design System (CAEADS) to support the design of military facilities. CAEADS' support will start with initial requirements for a facility, and continue through concept and final design and the production of construction drawings, specifications and cost estimates. The CAEADS system will be integrated based on a central source of design information used by all the disciplines in the design process: users, project planners, architects, engineers, specification writers, and cost estimators and drafters. In October of 1981, the integration of the concept design tools of the CAEADS system was completed and a test initiated involving 200 projects in the Military Construction Army (MCA) FY84 program. This integrated system, called Concept CAEADS, is used to support preliminary design, from project requirements through to the 25 percent design level. Concept CAEADS provides tools for project information retrieval, facility layout, functional evaluation, energy evaluation, cost estimating and production of drawings. During the period 1 October 81 to February 82, one architectural engineering firm tested and used Concept CAEADS to design to 25 percent these 200 MCA projects. The findings of the test suggest that substantial design cost reductions will be realized. GRA

N83-12736# World Meteorological Organization, Geneva (Switzerland).
TECHNICAL CONFERENCE ON CLIMATE: AFRICA
1982 541 p refs In ENGLISH and FRENCH Conf. held at Arusha, United Republic of Tanzania, 25-30 Jan 1982
(WMO-596, ISBN-92-63-00596-6) Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

Ways of using climatological data and knowledge to improve the efficiency of major economic activities and to alleviate the hazards of extreme climatic conditions were discussed. Food production, energy and water resources, and land use were studied.

N83-12737# Nairobi Univ (Kenya) Dept of Meteorology
THE CLIMATE OF AFRICA, INCLUDING FEASIBILITY STUDY OF CLIMATE ALERT SYSTEM
G. C. ASNANI In WMO Tech Conf on Climate Africa p 101-129 1982 refs
Avail. NTIS MF A01, print copy available at WMO, Geneva SW FR 35

The state of the art of climatology is reviewed, and the main influences on, and regional variations of, the climate of Africa are discussed. A medium and long-range weather forecasting system which predicts climate hazards and the impact of climate on society is proposed. The advantages of satellite meteorology are considered. Exploitation of inexhaustible energy sources (Sun, wind) is mentioned. Author (ESA)

N83-14016*# Jet Propulsion Lab., California Inst of Tech., Pasadena
PUBLICATIONS OF THE JET PROPULSION LABORATORY, 1981
15 Sep. 1982 39 p Sponsored by NASA
(NASA-CR-169519; JPL-BIBL-39-23, NAS 1.26.169519) Avail. NTIS HC A03/MF A01 CSCL 05B

Over 500 externally distributed technical reports released during 1981 that resulted from scientific and engineering work performed, or managed by Jet Propulsion Laboratory are listed by primary author. Of the total number of entries, 311 are from the bi-monthly Deep Space Network Progress Report, and its successor, the Telecommunications and Data Acquisition Progress Report. A R.H.

N83-15870# Arizona State Univ., Tempe Dept of Mechanical and Energy Systems Engineering
SOME MATERIAL IMPLICATIONS OF SPACE NUCLEAR REACTORS (NON-FUEL MATERIALS) Final Report
J. F. MORRIS In R and D Associates Proc of the AFOSR Spec Conf. on Prime-Power for High Energy Space Systems, Vol 2 13 p 1982
Avail: NTIS HC A99/MF A01

Nonfuel materials for space nuclear reactors, high temperature alloys and electric isolators are discussed. M.G.

N83-15877# National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio
DEEP IMPURITY TRAPPING CONCEPTS FOR POWER SEMICONDUCTOR DEVICES Final Report
G. R. SUNDBERG In R and D Associates Proc of the AFOSR Spec Conf. on Prime-Power for High Energy Space Systems, Vol 2 39 p 1982 refs
Avail: NTIS HC A99/MF A01 CSCL 20L

High voltage semiconductor switches using deep impurity doped silicon now appear feasible for high voltage (1-100 kV), high power (10 Kw) switching and protection functions for future space power applications. Recent discoveries have demonstrated several practical ways of gating deep impurity doped silicon devices in planar configurations and of electrically controlling their characteristics, leading to a vast array of possible circuit applications. A new family of semiconductor switching devices and transducers are possible based on this technology. New deep impurity devices could be simpler than conventional p-n junction devices and yet use the same basic materials and processing techniques. In addition, multiple functions may be possible on a single device as well as increased ratings. Author

N83-15880*# National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio
GROWTH OF DIAMONDLIKE FILMS FOR POWER APPLICATIONS Final Report
B. BANKS In R and D Associates Proc of the AFOSR Spec Conf. on Prime-Power for High Energy Space Systems, Vol. 2 33 p 1982 refs
Avail: NTIS HC A99/MF A01

Diamond has a high thermal conductivity (approximately 5 times that of copper) and is an ideal heat sink material for high power

semiconductor devices as well as being of interest as a semiconductor material. Numerous vacuum deposition processes are being evaluated by NASA-LeRC which have demonstrated the capability to deposit carbon films having some of the properties of diamond. Current activities include Investigation of high deposition rate vacuum processes suitable for synthesis of diamondlike carbon films. The results of recent film characterization tests are reported. Author

N83-15881# Naval Research Lab., Washington, D. C.

CERAMICS FOR HIGH POWER SOURCES IN SPACE Final Report

R. W. RICE /in R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 2 23 p 1982 refs

Avail. NTIS HC A99/MF A01

The general potential issues, and forms, of using ceramics in high power sources in space are first briefly reviewed; then some specific examples of using ceramics in energy systems are outlined. Next general ceramic research needs are discussed followed by a discussion of the research opportunities that are seen for ceramics; namely ceramic composites, fiber/whisker processing (especially by polymer pyrolysis), ternary and higher order compounds, and mimicking certain natural fiber-or biostructures. Author

N83-15882*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va

MATERIALS TECHNOLOGY FOR LARGE SPACE STRUCTURES Final Report

C. P. BLANKENSHIP and D. R. TENNEY /in R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 2 38 p 1982 refs

Avail: NTIS HC A99/MF A01

Several of the key material technology needs that were identified for large space structures are outlined. They include lightweight structural materials, materials durability in the space environment, and some special aspects of materials fabrication technology. Examples of current materials research directed toward large space structures are described. Additional research needs and opportunities are noted. A short bibliography is included of selected references that describe large space structural concepts and related technology needs in detail. R.J.F

N83-15883# Naval Research Lab., Washington, D. C. Lab. for the Structure of Matter.

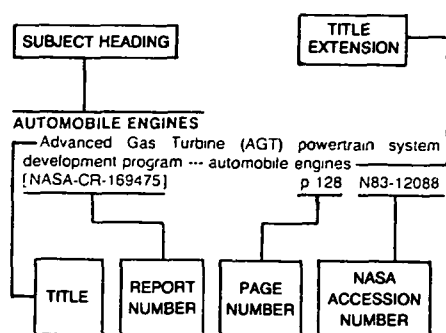
STRUCTURAL CHARACTERIZATION OF MATERIALS FOR HIGH ENERGY SPACE SYSTEMS Final Report

R. GILARDI /in R and D Associates Proc. of the AFOSR Spec. Conf. on Prime-Power for High Energy Space Systems, Vol. 2 20 p 1982

Avail NTIS HC A99/MF A01

A review is given describing the use of diffraction techniques for the characterization of the atomic arrangements of materials in the amorphous, crystalline and fibrous forms. This research relates structure to function or to physical and chemical properties. The techniques of X-ray, neutron and electron diffraction are employed. The resulting diffraction patterns are transformed into detailed structural information. An additional special technique involves the use of synchrotron radiation. It is of particular significance to studies of small samples, surfaces and anomalous dispersion applications. R J F

Typical Subject Index Listing



The subject heading is a key to the subject content of the document. The title, and title extension if used, provides the user with a brief description of the subject matter. The report number helps to indicate the type of document cited (e.g., NASA report, translation, NASA contractor report). The page and accession numbers are located beneath and to the right of the title. Under any subject heading the accession numbers are arranged in sequence with the AIAA accession numbers appearing first.

A

ABERRATION

Axissymmetric reflectors of the stepped spherical type p 38 N83-19194

ABIOTENESIS

Studies related to the deep earth gas [PB82-227653] p 84 N83-10213

ABLATION

Ion velocity measurements for laser mass ablation studies p 152 N83-16128

ABSORBERS (EQUIPMENT)

Absorption refrigeration machines --- Thesis p 156 A83-11525

ABSORBERS (MATERIALS)

Interaction of electromagnetic radiation and microstructural materials with regard to the production of spectral-selective solar absorbers --- German thesis p 37 A83-18497

ABSORPTANCE

Rapid simulated solar absorptance measurements on flat or curved surfaces p 32 A83-15476

ABSORPTION COOLING

Absorption refrigeration machines --- Thesis p 156 A83-11525

Absorption type water chiller fired directly by waste heat [BMFT-FB-T-82-129] p 7 N83-11593

ABSORPTIVITY

Optical absorption coefficient and minority carrier diffusion length measurements in low-cost silicon solar cell material p 30 A83-13922

Spectral selectivity of high-temperature solar absorbers II Effects of interference p 33 A83-15488

Flat plate solar collectors [BMFT-FB-T-82-139] p 68 N83-14764

AC GENERATORS

Organic Rankine power conversion subsystem development for the small community solar thermal power system p 43 N83-10533

Modifications and testing of a 4-95 Stirling engine for solar applications p 44 N83-10538
Dish Stirling system integration and test progress report p 44 N83-10539
Improved SCR ac motor controller for battery powered urban electric vehicles [NASA-CR-167919] p 169 N83-16257

ACCELERATION (PHYSICS)

Vertical axis wind turbine program p 147 N83-15913

ACETIC ACID

Membrane controlled anaerobic digestion p 85 N83-10497

ACETONE

Technical and economic assessment of processes for the production of butanol and acetone [NASA-CR-169623] p 106 N83-14293

ACID RAIN

Acid rain. CZMA [GPO-91-371] p 8 N83-11611
Effects of acid precipitation on elemental transport from terrestrial to aquatic ecosystems [DE82-002739] p 20 N83-14778

ACOUSTIC EMISSION

Television interference and acoustic emissions associated with the operation of the Darrieus VAWT p 149 N83-15934

ACOUSTIC LEVITATION

The use of buoyancy to lift heavy objects from the sea [AD-A119320] p 106 N83-14306

ACOUSTIC MEASUREMENT

State-of-the-art of acoustic instrumentation for coal-conversion plants [DE82-004037] p 96 N83-12254

ACOUSTIC MICROSCOPES

Evaluation of electrode shape and nondestructive evaluation method for welded solar cell interconnects [NASA-TM-82966] p 45 N83-10555

ACTIVATION ENERGY

Prospects of low-activation fusion-reactor design [DE82-003198] p 155 N83-16231

ACTUATOR DISKS

The dynamic inducer as a cost-effective wind turbine system p 118 A83-18457

ADDITIVES

Improvement of casing cementation of deep and ultradeep wells Part 2 Oilfield cements and cement additives [BMFT-FB-T-82-112-PT-2] p 93 N83-11365

Fractional characteristics and heat transfer of antimisting fuels in tubes [NASA-CR-169388] p 96 N83-12248

The effect of additives on the aerosolization of JP-5 jet fuel [AD-A119324] p 106 N83-14294

ADHESION

Development of an all-metal thick film cost effective metallization system for solar cells [NASA-CR-169635] p 59 N83-14674

Development of technique for AR coating nickel and copper metallization of solar cells FPS project product development [NASA-CR-169616] p 60 N83-14679

ADIABATIC CONDITIONS

Behavior of a plasma in a high-density gas-embedded Z-pinch configuration [DE82-017396] p 125 N83-10935

ADJUSTING

Automatic methods for the adjustment of faceted solar-energy concentrators and heliostats p 31 A83-15131

AERIAL PHOTOGRAPHY

Environmental monitoring of the Athabasca Oil Sands Region p 80 A83-14238

AERODYNAMIC CHARACTERISTICS

Cold-air performance of compressor-drive turbine of Department of Energy upgraded automobile gas turbine engine. 2: Stage performance [NASA-TM-82818] p 127 N83-11063

Aerodynamic research on tipvane wind turbines [VTH-LR-355] p 128 N83-11603

An experimental study of an aerodynamically optimum windmill [NAL-TR-698] p 129 N83-12522

Aerodynamic analysis of horizontal axis wind turbines p 130 N83-12530

Airfoil data for wind turbines p 130 N83-12531

Measured performance of a tip-controlled, teetered rotor with an NACA 64 sub 3-618 tip airfoil [NASA-TM-82870] p 136 N83-14689

Vertical axis wind turbine program p 147 N83-15913

AERODYNAMIC FORCES

Aerodynamics and performance testing of the VAWT [DE82-003574] p 137 N83-14760

AERODYNAMICS

Aerodynamics and performance testing of the VAWT p 149 N83-15933

AEROELASTICITY

Aeroelastic stability analysis of a Darrieus wind turbine [DE82-017001] p 121 N83-10603

AEROSOLS

The effect of additives on the aerosolization of JP-5 jet fuel [AD-A119324] p 106 N83-14294

AEROSPACE ENGINEERING

Publications of the Jet Propulsion Laboratory, 1981 [NASA-CR-169519] p 170 N83-14016

AEROSPACE ENVIRONMENTS

On the cause of the flat-spot phenomenon observed in silicon solar cells at low temperatures and low intensities p 63 N83-14705

AFRICA

Technical Conference on Climate Africa [WMO-596] p 170 N83-12736

The climate of Africa, including feasibility study of climate alert system p 170 N83-12737

AGGLOMERATION

Computer modeling of mixing and agglomeration in coal-conversion reactors Volume 1 Model formulation [DE82-014836] p 84 N83-10212

AGING (METALLURGY)

Aging of small cryogenic heat pipes [SABCA-JPM/LN/H05/N28] p 159 N83-13248

AGRICULTURE

Energy for agriculture in Pakistan [IIASA-RR-82-20] p 3 N83-10499

Market assessment of photovoltaic power systems for agricultural applications worldwide [NASA-CR-165541] p 56 N83-13585

The worldwide market for photovoltaics in the rural sector [NASA-TM-83035] p 73 N83-15840

Fifth Biennial Wind Energy Conference and Workshop (WWS) [DE82-014659] p 146 N83-15908

The USDA agricultural wind energy research program p 147 N83-15914

Agricultural application of SWECS p 111 N83-15923

AGROMETEOROLOGY

Study of ground winds in Upper Volta Economic and agronomic consequences for the Sudan-Sahel region of west Africa p 98 N83-12751

AIR

Research on oxidation by air and tempering of Raney nickel electrocatalysts for the H₂ anodes of alkali combustion materials cells --- German thesis p 119 A83-18494

AIR CONDITIONING

Conserving energy by improving the quality of the air purifying and air conditioning systems [BMFT-FB-T-82-067] p 6 N83-10651

Residential End-use Energy Planning System (REEPS) [DE82-906444] p 14 N83-13619

AIR CONDITIONING EQUIPMENT

The solar assisted air-source heat pump system, part 1 [PB82-218439] p 39 N83-10286

AIR FILTERS

Conserving energy by improving the quality of the air purifying and air conditioning systems [BMFT-FB-T-82-067] p 6 N83-10651

AIR FLOW

AIR FLOW

Emission characteristics of refractory materials --- as electrodes in aerodynamic generators

p 116 A83-16019
Economics of DAWT wind energy systems p 150 N83-15939

AIR POLLUTION

The satellite power system - Assessment of the environmental impact on middle atmosphere composition and on climate p 2 A83-14517

A thermal desorption cold-trap unit for gaschromatographic analysis of gaseous organic pollutants

[PB82-206368] p 3 N83-10152
Compilation of air pollutant emission factors, supplement 12

[PB82-184722] p 6 N83-10654
Atmosphere-biosphere interactions Toward a better understanding of the ecological consequences of fossil fuel combustion

[PB82-182098] p 12 N83-12672
Characterization of diesel emissions from operation of a light-duty diesel vehicle on alternate source diesel fuels

[PB82-232448] p 101 N83-13281
Vehicle characterization for the TAPCUT Project Performance and cost

[DE82-019772] p 13 N83-13465
Quality assurance in support of energy related monitoring activities

[PB82-234238] p 16 N83-13657
Sampling for high-molecular-weight organic compounds in power plant stack gases

[PB82-234618] p 16 N83-13659
Impact of NOx selective catalytic reduction processes on flue gas cleaning systems

[PB82-240086] p 16 N83-13664
Environmental assessment of stationary source NOx control technologies

[PB82-249350] p 16 N83-13665
Effects of acid precipitation on elemental transport from terrestrial to aquatic ecosystems

[DE82-002739] p 20 N83-14778
Ideas for implementing air-quality studies in the western Rocky Mountain region

[DE82-000063] p 22 N83-15960

AIR PURIFICATION

Conserving energy by improving the quality of the air purifying and air conditioning systems [BMFT-FB-T-82-067] p 6 N83-10651

AIR QUALITY

Southern California offshore air quality model validation study Volume 1 Executive summary --- oil exploration pollution impact

[PB82-190711] p 9 N83-11631
Southern California offshore air quality model validation study Volume 2 Synthesis of findings

[PB82-190729] p 9 N83-11632
Evaluation of short-term NO2 plume models for point sources Volume 1 Technical discussion

[PB82-234329] p 16 N83-13658
Cleaning up the environment Progress achieved but major unresolved issues remain

[GAO/CED-82-72] p 19 N83-14767
Ideas for implementing air-quality studies in the western Rocky Mountain region

[DE82-000063] p 22 N83-15960

AIR SAMPLING

Sampling for high-molecular-weight organic compounds in power plant stack gases

[PB82-234618] p 16 N83-13659

AIR TRAFFIC CONTROL

Fuel savings in air transport p 2 A83-19150

AIR TRANSPORTATION

Fuel savings in air transport p 2 A83-19150
The modal split in the Japanese passenger transportation system

[DFVLR-FB-82-09] p 9 N83-11887

AIR WATER INTERACTIONS

Southern California offshore air quality model validation study Volume 1 Executive summary --- oil exploration pollution impact

[PB82-190711] p 9 N83-11631
Southern California offshore air quality model validation study Volume 2 Synthesis of findings

[PB82-190729] p 9 N83-11632

AIRBORNE EQUIPMENT

Experimental feasibility of the airborne measurement of absolute oil fluorescence spectral conversion efficiency p 169 A83-18581

AIRBORNE/SPACEBORNE COMPUTERS

OAO-3 end of mission power subsystem evaluation [NASA-TM-83959] p 161 N83-11580

AIRCRAFT ACCIDENTS

Antimisting kerosene atomization and flammability [NASA-CR-169385] p 95 N83-12246

AIRCRAFT CONSTRUCTION MATERIALS

The application of energy saving concepts to future fighter/attack aircraft design [AIAA PAPER 83-0092] p 2 A83-16516

AIRCRAFT DESIGN

The application of energy saving concepts to future fighter/attack aircraft design [AIAA PAPER 83-0092] p 2 A83-16516

AIRCRAFT ENGINES

The theory of aircraft engines --- Russian book p 113 A83-10675
Propulsion and energetics panel, working group 13 on alternative jet engine fuels Volume 1 Executive summary

[AGARD-AR-181-VOL-1] p 92 N83-11350
Propulsion and energetics panel, working group 13 on alternative jet engine fuels Volume 2 Main report

[AGARD-AR-181-VOL-2] p 92 N83-11351
Energy efficient engine Flight propulsion system preliminary analysis and design

[NASA-CR-159859] p 9 N83-12094

AIRCRAFT EQUIPMENT

Electric power supply of aircraft --- Russian book p 115 A83-14115

AIRCRAFT FUELS

Estimation of aircraft fuel consumption p 1 A83-10186
Tests of blending and correlation of distillate fuel properties

p 78 A83-11050
Evaluation of methods for rapid determination of freezing point of aviation fuels

[NASA-CR-167981] p 83 N83-10207
Aviation turbine fuels An assessment of alternatives [NASA-CR-169395] p 84 N83-10214

Propulsion and energetics panel, working group 13 on alternative jet engine fuels Volume 1 Executive summary

[AGARD-AR-181-VOL-1] p 92 N83-11350
Propulsion and energetics panel, working group 13 on alternative jet engine fuels Volume 2 Main report

[AGARD-AR-181-VOL-2] p 92 N83-11351
The impact of petroleum, synthetic and cryogenic fuels on civil aviation

[FAA-EM-82-29] p 106 N83-14291

AIRCRAFT MAINTENANCE

Aircraft thrust/power management can save defense fuel, reduce engine maintenance costs, and improve readiness [GAO/PLRD-82-74] p 18 N83-14074

AIRFOILS

Airfoil data for wind turbines p 130 N83-12531
Measured performance of a tip-controlled, teetered rotor with an NACA 64 sub 3-618 tip airfoil

[NASA-TM-82870] p 136 N83-14689

AIRLINE OPERATIONS

Airline economics --- Book p 2 A83-14000

ALASKA

Coal to methanol feasibility study Beluga methanol project Volume 4 Environmental [DE82-006057] p 10 N83-12542

Developing Alaska's energy resources Actions needed to stimulate research and improve wetlands permit processing [GAO/EMD-82-44] p 18 N83-14664

ALBEDO

50 per cent more output power from an albedo-collecting flat panel using bifacial solar cells p 29 A83-13700

ALCOHOLS

Biomass fuels update TVAs biomass fuels program [DE82-904990] p 89 N83-10613
Fumigation of alcohol in a light duty automotive diesel engine

[NASA-CR-167915] p 100 N83-13272
Assessment/review of methanol technology and utilization as a fuel

[AD-A120109] p 109 N83-15489

ALGAE

Effects of oil on tundra ponds and streams [DE82-018899] p 15 N83-13649

ALGORITHMS

Neutral-beam deposition in large, finite-beta noncircular Tokamak plasmas [DE82-008146] p 127 N83-10957

Solar availability in cities and towns A computer model [PB82-202201] p 49 N83-11608
Computerized instrumented residential audit, version 10 Source listings

[DE82-019953] p 14 N83-13613
Nonlinear algorithms application to irradiated solar cell parameters evaluation p 62 N83-14700

ALIGNMENT

Helios movable Hartmann ball [DE82-000756] p 155 N83-16220

ALKALINE BATTERIES

Zinc electrode morphology in alkaline solutions I - Study of alternating voltage modulation on a rotating disk electrode p 115 A83-15867

Research on oxidation by air and tempering of Raney nickel electrocatalysts for the H2 anodes of alkali combustion materials cells --- German thesis p 119 A83-18494

Polyvinyl alcohol membranes as alkaline battery separators [NASA-TM-82961] p 119 N83-10135

Development of improved separators for alkaline zinc batteries [AD-A119150] p 166 N83-14743

Alkaline fuel cells for prime power and energy storage p 167 N83-15845

ALKANES

Pyrolysis of organic compounds containing long unbranched alkyl groups [AD-A119749] p 104 N83-14165

ALPHA PARTICLES

Sufficient stability condition for alpha-driven velocity-space modes in compression Tokamak [IPPJ-609] p 131 N83-12996

Comments on thermal runaway experiments in sub-ignition Tokamaks [IPPJ-610] p 131 N83-12997

ALTERNATING CURRENT

Zinc electrode morphology in alkaline solutions I - Study of alternating voltage modulation on a rotating disk electrode p 115 A83-15867

Improved transistorized AC motor controller for battery powered urban electric passenger vehicles [NASA-CR-167978] p 120 N83-10349

ALUMINUM

Ocean thermal energy at the Johns Hopkins University Applied Physics Laboratory [PB82-215054] p 122 N83-10639

Analysis of target implosion irradiated by proton beam 1. Beam interaction with target plasma [IPPJ-612] p 134 N83-13989

Defect behavior in electron-irradiated boron- and gallium-doped silicon p 70 N83-15823

ALUMINUM ALLOYS

On the properties of the superplastic aluminum-calcium alloy as material for solar collectors p 34 A83-15496

Welding of AL-MG alloy 5083-0 for the construction of LNG storage tanks p 93 N83-11500

ALUMINUM GALLIUM ARSENIDES

A study of silicon and GaAs solar cells, and their optical coupling by means of a dichroic mirror --- French thesis p 23 A83-11764

Solar-cell testing and evaluation [DE82-016179] p 52 N83-12562

Defects and annealing studies in 1-Me electron irradiated (AlGa)As-GaAs solar cells p 70 N83-15822

ALUMINUM OXIDES

Applications of a high temperature radiation resistant electrical insulation p 144 N83-15874

AMBIENT TEMPERATURE

Intermediate photovoltaic system application experiment operational performance report for CDC Light Manufacturing Building, San Bernardino, California [DE82-020883] p 56 N83-13599

AMMONIA

Absorption refrigeration machines --- Thesis p 156 A83-11525

Ocean thermal energy at the Johns Hopkins University Applied Physics Laboratory [PB82-215054] p 122 N83-10639

Laboratory research for desulfurizing and NO-reduction by addition of ammonia under the conditions of the Bergbau-Forschung flue gas desulfurizing process [BMFT-FB-T-82-147] p 9 N83-11617

AMORPHOUS MATERIALS

Structural characterization of materials for high energy space systems p 171 N83-15883

AMORPHOUS SEMICONDUCTORS

Recent progress of amorphous-silicon solar-cell technology in Japan p 24 A83-11803

Meaning of the photovoltaic band gap for amorphous semiconductors p 25 A83-12287

Properties of amorphous silicon solar cells p 25 A83-12321

Valency control of glow discharge produced a-SiC:H and its application to heterojunction solar cells p 28 A83-13649

Recent advances in amorphous silicon solar cells p 34 A83-15510

The residual voltage in fast electrophotography of a-SiH_x/x/ p 34 A83-15511

Hydrogenated a-Si_x/Ge_{1-x}/ - A potential solar cell material p 34 A83-15871

Changes in photovoltaic and dark electrical properties of hydrogenated amorphous silicon diodes induced by forward bias carrier injection p 34 A83-16021

SUBJECT INDEX

- Effect of hydrogen on the deposition rate for planar RF magnetron sputtering of hydrogenated amorphous silicon p 35 A83-16082
- Research and development on a MIS thin film solar cell made of amorphous silicon [BMFT-FB-T-82-079] p 47 N83-10620
- ANAEROBES**
- Membrane controlled anaerobic digestion p 85 N83-10497
- Photosynthetic water splitting [PB82-200684] p 76 N83-12206
- Technology assessment of anaerobic systems for municipal wastewater treatment: Part 1 Anaerobic fluidized bed Part 2 ANFLOW [PB82-229170] p 17 N83-13670
- ANEMOMETERS**
- Simple anemometer for wind classification [BMFT-FB-T-82-106] p 92 N83-10719
- ANISOTROPY**
- Antenna-plasma coupling theory for ICRF heating of large tokamaks [DE82-013226] p 125 N83-10933
- Anisotropy in MHD turbulence due to a mean magnetic field [NASA-TM-84000] p 131 N83-12998
- ANNEALING**
- Self-annealed ion implanted solar cells p 25 A83-12290
- Defects and annealing studies in 1-Me electron irradiated (AlGa)As-GaAs solar cells p 70 N83-15822
- Defect behavior in electron-irradiated boron- and gallium-doped silicon p 70 N83-15823
- Microdistribution of oxygen in silicon and its effects on electronic properties p 71 N83-15825
- Radiation damage and annealing in large area n+/p/p+ GaAs shallow homojunction solar cells p 71 N83-15826
- Grown-in defects and defects produced by 1-Me electron irradiated in AlO 3Ga0.7As P-N junction solar cells p 71 N83-15828
- Radiation damage p 72 N83-15837
- Blanket technology p 72 N83-15838
- ANNUAL VARIATIONS**
- Analysis of thermal comfort in a passive solar heated residence [PB82-180142] p 39 N83-10297
- Seasonal thermal storage Swedish practice, developments and cost projections [PB82-232331] p 165 N83-13635
- ANODES**
- Crude gas/air fuel cells with a phosphoric acid matrix [BMFT-FB-T-82-187] p 128 N83-11601
- Thermal battery systems for ordnance fuzing [AD-A119155] p 163 N83-13590
- ANODIC COATINGS**
- On the properties of the superplastic aluminum-calcium alloy as material for solar collectors p 34 A83-15496
- Thermal battery systems for ordnance fuzing [AD-A119155] p 163 N83-13590
- ANTENNAS**
- Antenna-plasma coupling theory for ICRF heating of large tokamaks [DE82-013226] p 125 N83-10933
- ANTIMISTING FUELS**
- Antimisting kerosene atomization and flammability [NASA-CR-169385] p 95 N83-12246
- Frictional characteristics and heat transfer of antimisting fuels in tubes [NASA-CR-169388] p 96 N83-12248
- The effect of additives on the aerosolization of JP-5 jet fuel [AD-A119324] p 106 N83-14294
- ANTIREFLECTION COATINGS**
- The effect of Ta2O5 on the interaction between silicon and its contact metallization [NASA-TM-82948] p 45 N83-10554
- AQUATIC PLANTS**
- Microbiological studies towards optimization of methane from marine plant biomass [PB82-214362] p 92 N83-10756
- AQUEOUS SOLUTIONS**
- Thermodynamic data for desulfurization processes [PB82-184904] p 95 N83-12207
- Performance and emissions characteristics of aqueous alcohol fuels in a DI diesel engine [NASA-CR-167917] p 96 N83-12250
- AQUIFERS**
- Geothermal-resource survey of the Tennessee Valley Region [DE82-021951] p 98 N83-12706
- Compressed-air energy storage preliminary design and site-development program in an aquifer. Volume 1 Executive summary [DE82-019284] p 164 N83-13610

- Compressed-air energy storage preliminary design and site-development program in an aquifer. Volume 2: Utility-system planning [DE82-019993] p 164 N83-13611
- Aquifer stability investigation [DE82-003831] p 166 N83-14754
- Economic comparison of CAES designs employing hardrock, salt and aquifer storage reservoirs [DE82-003833] p 167 N83-14758
- ARCHITECTURE**
- CAEDS Computer-aided engineering and architectural design system [AD-A117972] p 170 N83-11794
- Earth-covered buildings An exploratory analysis for hazard and energy performance [PB82-189564] p 10 N83-12285
- Electrical aspects of photovoltaic-system simulation [DE82-021956] p 53 N83-12568
- Telluride School, Telluride, Colorado solar-energy-system performance evaluation, February 1982 - April 1982 p 54 N83-12585
- Performance criteria for photovoltaic energy systems, volume 1 [DE82-021958] p 56 N83-13596
- Computerized instrumented residential audit, version 1.0 Source listings [DE82-019953] p 14 N83-13613
- Acceptance-test report for El Toro Library solar heating and cooling demonstration project (SHAC no 1501) [DE82-018859] p 57 N83-13616
- ARCTIC OCEAN**
- Understanding the Arctic Sea floor for engineering purposes [AD-A119773] p 108 N83-14877
- ARCTIC REGIONS**
- Arctic terrestrial environmental research programs of the Office of Energy Research, Department of Energy Evaluation and recommendations Appendix A. Terrestrial environmental research in Alaska during 1980-1981 [PB82-197096] p 9 N83-11633
- Arctic terrestrial environment research programs of the Office of Energy Research, Department of Energy Evaluation and recommendations [PB82-197088] p 9 N83-11634
- ARGON PLASMA**
- Effect of radiation and non-Maxwellian electron distribution on relaxation processes in an atmospheric cesium seeded argon plasma [EUT-82-E-124] p 140 N83-15144
- ARKANSAS**
- Hydrogeochemical and stream-sediment reconnaissance basic data for Sherman, Taxarkana, El Dorado, and Greenwood quadrangles, Oklahoma, Texas, Arkansas, Mississippi [DE82-020436] p 102 N83-13559
- ARRAYS**
- Computer-simulation code for the prediction of reliability and available capacity of modular energy-storage arrays. Volume 1. Overview [DE82-906445] p 164 N83-13618
- ARTIFICIAL SATELLITES**
- Investigation of power processing technology for spacecraft applications [AD-A119644] p 135 N83-14151
- ASHES**
- Ashing properties of coal blends p 86 N83-10572
- Coal fly ash disposal in the ocean An alternative worth considering [DE82-003835] p 20 N83-14781
- ASPECT RATIO**
- Radial guiding-center drifts and omnigenity in bumpy-torus confinement systems [DE82-019802] p 135 N83-14000
- ASSEMBLING**
- Engineering features of the INTOR conceptual design [DE82-002808] p 156 N83-16232
- ASYMMETRY**
- Analysis of thermal comfort in a passive solar heated residence [PB82-180142] p 39 N83-10297
- ATLANTIC OCEAN**
- Geological studies of the COST numbers G-1 and G-2 wells, United States north Atlantic outer continental shelf [USGS-CIRC-881] p 94 N83-11638
- ATMOSPHERIC BOUNDARY LAYER**
- A diagnostic model for estimating winds at potential sites for wind turbines p 79 A83-12954
- ATMOSPHERIC CHEMISTRY**
- Summary outline of DOE geoscience and geoscience related research [DE82-008203] p 97 N83-12480
- Atmosphere-biosphere interactions: Toward a better understanding of the ecological consequences of fossil fuel combustion [PB82-182098] p 12 N83-12672

AUTOMOBILE FUELS

- ATMOSPHERIC COMPOSITION**
- The satellite power system - Assessment of the environmental impact on middle atmosphere composition and on climate p 2 A83-14517
- ATMOSPHERIC HEAT BUDGET**
- A project for exploitation of a new form of solar energy: the wind chill I - The importance to the energy field II - Application for building heat and electricity production p 38 A83-19238
- ATMOSPHERIC TURBULENCE**
- The spectrum of wind speed fluctuations encountered by a rotating blade of a wind energy conversion system p 114 A83-13695
- ATOMIC BEAMS**
- Plasma parameter measurements using neutral-particle-beam attenuation [DE82-021120] p 132 N83-13001
- ATOMIC STRUCTURE**
- Structural characterization of materials for high energy space systems p 171 N83-15883
- ATOMIZING**
- Antimisting kerosene atomization and flammability [NASA-CR-169385] p 95 N83-12246
- ATTENUATION**
- Neutron attenuation in the laser ducts of an inertial-confinement fusion reactor [DE82-007195] p 126 N83-10947
- ORNL integral experiment to provide data for evaluating magnetic-fusion-energy shielding concepts Part 1 Attenuation measurements [DE82-018775] p 135 N83-13999
- ATTITUDE (INCLINATION)**
- A point focusing collector for an integrated water/power complex p 44 N83-10541
- AUSTENITIC STAINLESS STEELS**
- Stress-corrosion studies in coal-liquefaction environments [DE82-001484] p 100 N83-13240
- AUTOCLAVING**
- Catalytic hydrodeoxygenation of coal-derived liquids and related oxygen-containing compounds p 81 N83-10132
- AUTOMATIC CONTROL**
- Automatic methods for the adjustment of faceted solar-energy concentrators and heliostats p 31 A83-15131
- Fusion Energy Division automation of the ISX-B neutral beams [DE82-016369] p 132 N83-13008
- Operational experience on MP-200 series commercial wind turbine generators p 147 N83-15917
- AUTOMATIC FLIGHT CONTROL**
- Economic modeling of fault tolerant flight control systems in commercial applications p 1 A83-11156
- AUTOMOBILE ENGINES**
- Design of a low emission combustor for an automotive gas turbine [AIAA PAPER 83-0338] p 117 A83-16664
- Sensitivities of internal combustion automotive engines to variations in fuel properties [PB82-194961] p 84 N83-10430
- Recent tests on the Carter small reciprocating steam engines p 43 N83-10536
- Determination of a range of concern for mobile source emissions of hydrogen sulfide [PB82-201773] p 6 N83-10663
- Automotive Stirling Engine Mod 1 Design Review, volume 2 [NASA-CR-167936] p 127 N83-10991
- Cold-air performance of compressor-drive turbine of Department of Energy upgraded automobile gas turbine engine. 2: Stage performance [NASA-TM-82818] p 127 N83-11063
- Advanced Gas Turbine (AGT) powertrain system development program --- automotive engines [NASA-CR-169475] p 128 N83-12088
- Advanced Gas Turbine (AGT) powertrain system development for automotive applications [NASA-CR-165178] p 129 N83-12431
- Concept evaluation of automotive propulsion using liquid air/nitrogen, task 5 report p 129 N83-12439
- Advanced Gas Turbine (AGT) powertrain system development for automotive applications [NASA-CR-165329] p 132 N83-13038
- Losses in chopper-controlled DC series motors [NASA-CR-167845] p 133 N83-13359
- Automotive Stirling engine development program [NASA-CR-167907-2] p 140 N83-15176
- Automotive Stirling engine development program [NASA-CR-167907-1] p 140 N83-15177
- AUTOMOBILE FUELS**
- Sensitivities of internal combustion automotive engines to variations in fuel properties [PB82-194961] p 84 N83-10430

AUTOMOBILES

- The joint Australia/Federal Republic of Germany feasibility study on the conversion of Australian coals into liquid fuels in Australia [BMFT-FB-T-82-133] p 94 N83-11595
- Assessment of current and projected future trends in light-duty-vehicle fuel switching Subtask 1 [DE82-018816] p 97 N83-12440
- Increased automobile fuel efficiency and synthetic fuels Alternatives for reducing oil imports [OTA-E-186] p 12 N83-13270
- Characterization of diesel emissions from operation of a light-duty diesel vehicle on alternate source diesel fuels [PB82-232448] p 101 N83-13281
- AUTOMOBILES**
- Garrett solar Brayton engine/generator status p 44 N83-10545
- The modal split in the Japanese passenger transportation system [DFVLR-FB-82-09] p 9 N83-11887
- Concept evaluation of automotive propulsion using liquid air/nitrogen, task 5 report p 129 N83-12439
- Vehicle characterization for the TAPCUT Project Performance and cost [DE82-019772] p 13 N83-13465
- AUXILIARY POWER SOURCES**
- Wood Road School, Ballston Spa, New York solar-energy-system performance evaluation, November 1981 - April 1982 [DE82-021301] p 54 N83-12586
- Lawrence Berkeley Laboratory neutral-beam engineering test facility power-supply system [DE82-003044] p 137 N83-15104
- Global model of a hybrid Tokamak reactor with an auxiliary RF heating p 153 N83-16137
- AXES OF ROTATION**
- Aerodynamic analysis of horizontal axis wind turbines p 130 N83-12530
- Static and dynamic analysis for hinged rotor blades of 60 m span for a two bladed horizontal axis wind energy converter p 130 N83-12535
- The 17-M VAWT program [DE82-003497] p 137 N83-14756
- AXIAL FLOW**
- Momentum theory, dynamic inflow, and the vortex-ring state p 116 A83-16026
- Some innovative concepts in wind turbines of the axial-flow, cross-flow, and combined (dual) flow types p 149 N83-15935
- AXIAL FLOW TURBINES**
- Performance of the Wells turbine at starting p 113 A83-10661
- Organic Rankine power conversion subsystem development for the small community solar thermal power system p 43 N83-10533
- Users manual for WIND p 130 N83-12534
- AXISYMMETRIC BODIES**
- Axisymmetric reflectors of the stepped spherical type p 38 A83-19194

B

- BAND STRUCTURE OF SOLIDS**
- Meaning of the photovoltaic band gap for amorphous semiconductors p 25 A83-12287
- BARIUM TITANATES**
- Study of the photovoltaic effect in thin film barium titanate [NASA-CR-169435] p 46 N83-10567
- BARRIERS**
- LNG plume interaction with surface obstacles [PB82-198995] p 12 N83-12666
- BASIC (PROGRAMMING LANGUAGE)**
- Computerized instrumented residential audit, version 1.0 Source listings [DE82-019953] p 14 N83-13613
- BATTERY CHARGERS**
- Deep discharge reconditioning and shorted storage of batteries -- nickel cadmium batteries [NASA-CR-167953] p 120 N83-10502
- Ambient temperature rechargeable lithium battery [AD-A119297] p 166 N83-14742
- BAY ICE**
- Ice distribution and winter surface circulation patterns, Kachemak Bay, Alaska p 1 A83-12038
- BEAM INJECTION**
- Sausage instability of Z-discharged plasma channel in LIB-fusion device [IPPJ-602] p 123 N83-10917
- Fusion Energy Division automation of the ISX-B neutral beams [DE82-016369] p 132 N83-13008
- BEAM PLASMA AMPLIFIERS**
- A relativistic plasma microwave generator p 115 A83-15909

BEAM SPLITTERS

- Volatile production during preignition heating [DE82-003061] p 109 N83-15402

BEAMS (RADIATION)

- Transport of light-ion beams in plasma channels [DE82-001649] p 139 N83-15140

BEARINGLESS ROTORS

- DOE/UTRC kW development program p 74 N83-15924

BEARINGS

- Determination of friction coefficients on several distant heat pipe sections with different sliding partners -- static friction measurement of flat bearings [BMFT-FB-T-82-095] p 158 N83-10397

BENDING

- Contact stresses on a thin plate after large displacements to a full parabolic surface [DE82-005712] p 55 N83-13504

BENEFICIATION

- Fossil-energy [DE82-018269] p 86 N83-10570
- Performance characteristics of heavy media cyclones using fly ash-derived heavy media p 86 N83-10574

BERNSTEIN ENERGY PRINCIPLE

- Observation of the parametric decay instability during electron cyclotron resonance heating on the Versator 2 Tokamak [DE82-012573] p 125 N83-10939

BETA FACTOR

- Parametric systems analysis of the Modular Stellarator Reactor (MSR) [DE82-016244] p 126 N83-10945
- Observations of plasma rotation in the high-beta Tokamak Torus 2 [DE82-019373] p 127 N83-10952
- Neutral-beam deposition in large, finite-beta noncircular Tokamak plasmas [DE82-008146] p 127 N83-10957

BETA PARTICLES

- Resistive MHD studies of high-beta Tokamak plasmas [DE82-008011] p 126 N83-10942
- Observations of plasma rotation in the high-beta Tokamak Torus 2 [DE82-019373] p 127 N83-10952

BIBLIOGRAPHIES

- Heat transfer - A review of 1981 literature p 169 A83-17701
- Publications of the Jet Propulsion Laboratory, 1981 [NASA-CR-169519] p 170 N83-14016

BINARY FLUIDS

- Liquid-vapor equilibrium for ternary natural gas system [PB82-227679] p 82 N83-10160
- Development of geothermal binary-cycle working-fluid properties Information and analysis of cycles [DE82-021542] p 102 N83-13602

BIOCONVERSION

- Membrane controlled anaerobic digestion p 85 N83-10497
- Water hyacinth wastewater treatment system p 88 N83-10586
- Landfill gas recovery: An analysis of results p 89 N83-10596

- Microbiological studies towards optimization of methane from manne plant biomass [PB82-214362] p 92 N83-10756

- Questions and answers about energy recovery from waste [DE82-022154] p 10 N83-12580

BIOLOGICAL EFFECTS

- Environmental Research Guiding Committee report [PB82-220070] p 6 N83-10661
- Determination of a range of concern for mobile source emissions of hydrogen sulfide [PB82-201773] p 6 N83-10663
- Superior heat-transfer fluids for solar heating and cooling applications Results of acute oral-toxicity determinations [DE82-002758] p 52 N83-12560

BIOMASS

- Gasification kinetics for biomass decomposition [PB82-199043] p 97 N83-12256
- Technical and economic assessment of processes for the production of butanol and acetone [NASA-CR-169623] p 106 N83-14293
- Catalytic liquefaction of biomass [DE82-003329] p 108 N83-14752

BIOMASS ENERGY PRODUCTION

- Biomass energy p 81 A83-18560
- Kinetics and catalysis of producing synthetic gases from biomass [PB82-214347] p 82 N83-10156
- The feasibility of refuse-fired energy generation in Philadelphia, Pennsylvania p 88 N83-10587
- Biomass fuels update TVAs biomass fuels program [DE82-904990] p 89 N83-10613

- Microbiological studies towards optimization of methane from manne plant biomass [PB82-214362] p 92 N83-10756

- Conversion of forest residues to a methane-rich gas in a high-throughput gasifier [DE82-020289] p 102 N83-13601

- The Tennessee Valley Authority's biomass fuels program [DE81-904161] p 109 N83-15495

BIOMEDICAL DATA

- Biomedical and environmental sciences programs at the Oak Ridge National Laboratory [DE82-019897] p 13 N83-13516

BIOREACTORS

- ANFLOW Characterization and development of an energy conserving wastewater treatment system p 4 N83-10585

BIOSPHERE

- Atmosphere-biosphere interactions Toward a better understanding of the ecological consequences of fossil fuel combustion [PB82-182098] p 12 N83-12672

BIPOLARITY

- Parametric behavior of the circulating zinc-bromine battery [DE82-001910] p 167 N83-14759

BITUMENS

- Investigation of extracts by fluidized bed extraction [BMFT-FB-T-82-068] p 81 N83-10142
- Resource targets for advanced underground coal extraction systems [NASA-CR-169429] p 85 N83-10503

BLADE TIPS

- The dynamic inducer as a cost-effective wind turbine system p 118 A83-18457
- Aerodynamic research on tipvane wind turbines [VTH-LR-355] p 128 N83-11603
- Control systems for horizontal-axis wind turbines p 130 N83-12532
- Measured performance of a tip-controlled, teetered rotor with an NACA 64 sub 3-618 tip airfoil [NASA-TM-82870] p 136 N83-14689
- Optimization of the dynamic inducer wind turbine system p 150 N83-15940

BLANKETS (FISSION REACTORS)

- Methods to enhance blanket power density [DE82-017467] p 127 N83-10958

BOILERS

- An experimental study and modeling of heat transfer in boilers of small and medium power -- French thesis p 80 A83-15841

- Sewage sludge as a supplementary utility boiler fuel p 88 N83-10590

- Development of a solid waste fired fluidized boiler, phase 1 p 88 N83-10592

- Performance analysis of cofiring densified refuse derived fuel in a military boiler [AD-A118022] p 93 N83-11583

- Steam generator with circulating atmospheric fluidized bed combustion [BMFT-FB-T-82-134] p 94 N83-11596

- Boiler efficiency and emissions testing using Refuse-Derived Fuel (RDF) and coal [AD-A119291] p 19 N83-14772

- Study of the formation of submicron particulates generated by coal combustion p 21 N83-15401

- Potential for use of peat blends with coal for electric power generation [DE82-003634] p 110 N83-15497

BOOMS (EQUIPMENT)

- Extendible and retractable masts for solar array developments p 65 N83-14725

BOREHOLES

- Corrosion tests in the Marchwood geothermal borehole [AERE-G-2225] p 112 N83-15959

BORON

- Defect behavior in electron-irradiated boron- and gallium-doped silicon p 70 N83-15823

BOUNDARY LAYERS

- Interaction in limited arrays of windmills [DE82-750056] p 133 N83-13608

- Wind power assessment along the Atlantic and Gulf Coasts of the United States p 108 N83-14816

BOUNDARY VALUE PROBLEMS

- Techniques for the solution of MHD generator flows [AIAA PAPER 83-0465] p 118 A83-17928

BRAYTON CYCLE

- Garrett solar Brayton engine/generator status p 44 N83-10545

- Application of the subatmospheric engine to solar thermal power p 45 N83-10546

- Overview of space reactors p 142 N83-15855

- Power conversion Overview p 145 N83-15898

SUBJECT INDEX

- BRAZIL**
Automatic interpretation of MSS-LANDSAT data applied to coal refuse site studies in southern Santa Catarina State, Brazil [E83-10066] p 18 N83-14575
- BREEDER REACTORS**
Demonstration Tokamak power plant study [DE82-016182] p 125 N83-10937
Methods to enhance blanket power density [DE82-017467] p 127 N83-10958
Feasibility study of a fission-suppressed tandem-mirror hybrid reactor [DE82-019375] p 134 N83-13997
Applications of a high temperature radiation resistant electrical insulation p 144 N83-15874
- BREMSSTRAHLUNG**
Behavior of a plasma in a high-density gas-embedded Z-pinch configuration [DE82-017396] p 125 N83-10935
Soft X-ray and VUV emission from REB-heated plasma in REBEX 1 and REBEX 1 machines p 152 N83-16130
- BRICKS**
Evaluation of olivine ceramic refractories for thermal-energy-storage application [DE82-000108] p 168 N83-15947
- BRIDGES (STRUCTURES)**
Data collection and analysis for geothermal research [PB82-185430] p 97 N83-12390
- BRINES**
A computer simulation model of salt-gradient solar ponds p 55 N83-13580
- BROADBAND**
Solar energy conversion using surface plasmons for broadband energy transport p 69 N83-15815
- BROADCASTING**
System analysis, design, construction and commission of a photovoltaic power plant for supply of broadcasting equipment [BMFT-FB-T-82-125] p 68 N83-14763
- BUBBLE CHAMBERS**
Stability and disturbance of large dc superconducting magnets [DE82-012388] p 122 N83-10879
- BUILDINGS**
Economical optimized thermal insulation in buildings [BMFT-FB-T-82-131] p 8 N83-11594
Prototype solar house Study of the scientific evaluation and feasibility of a research and development project [BMFT-FB-T-82-137] p 49 N83-11598
- BUMPY TORUSES**
US-Japan Joint Institute for Fusion Theory Workshop on Equilibrium, Stability and Transport of Nonaxisymmetric Systems [IPPJ-577] p 124 N83-10922
Non-circular bumpy torus [IPPJ-607] p 134 N83-13990
Fusion research at ORNL [DE82-017766] p 134 N83-13994
Radial guiding-center drifts and omnigenity in bumpy-torus confinement systems [DE82-019802] p 135 N83-14000
ELMO Bumpy Torus fusion-reactor design study [DE82-002388] p 154 N83-16218
CAMAC based inter-computer communications system [DE82-002679] p 156 N83-16233
- BUOYANCY**
The use of buoyancy to lift heavy objects from the sea [AD-A119320] p 106 N83-14306
- BUOYS**
Preliminary analysis of wave energy conversion at an offshore structure [AD-A120079] p 146 N83-15903
- BURNING RATE**
A laboratory approach to obtain suspension combustion data for reuse derived fuels p 87 N83-10579
- BY-PRODUCTS**
Utilization of ANCIT plant by-products [BMFT-FB-T-82-144] p 94 N83-11600
- C**
- CADMIUM SELENIDES**
Influence of deposition rate on the character of electrodeposited CdSe used for photoelectrochemical cells p 34 A83-15499
Hot-electron luminescence in aged electrodeposited CdSe liquid-junction solar cell p 36 A83-16946
- CADMIUM SULFIDES**
A p-n heterojunction model for the thin-film CuInSe₂/CdS solar cell p 30 A83-14513
Use of test structures in the production of CdS/Cu₂S photovoltaic devices p 32 A83-15455
Heat-treatment studies on thin-film CdS/Cu_x/S solar cells p 35 A83-16084
- Photovoltaic properties of cadmium sulfide/trivalent-metal phthalocyanine heterojunction devices p 39 A83-19259
Electrophoretic CdS/Cu₂S solar cells for space applications p 63 N83-14704
- CADMIUM TELLURIDES**
Direct-gap group IV semiconductors based on tin p 22 A83-10294
- CALCIUM**
Thermal battery systems for ordnance fuzing [AD-A119155] p 163 N83-13590
- CALCIUM COMPOUNDS**
On the properties of the superplastic aluminum-calcium alloy as material for solar collectors p 34 A83-15496
- CALCIUM OXIDES**
Mechanisms of dry SO₂ control processes [PB82-196924] p 12 N83-12668
CaO interactions in the staged combustion of coal [DE82-003273] p 105 N83-14205
- CALCIUM SULFIDES**
CaO interactions in the staged combustion of coal [DE82-003273] p 105 N83-14205
- CALCULATORS**
TI-59 program for calculating the annual energy requirements for residential heating and cooling Volume 1 Users manual p 13 N83-13594
TI-59 program for calculating the annual energy requirements for residential heating and cooling Volume 2 Program reference manual [DE82-020275] p 13 N83-13595
- CALIBRATING**
Calibration of solar cells by the reference cell method - The spectral mismatch problem p 28 A83-13580
Solar hemispherical reflectometer modification for second-surface mirror measurement [DE82-016913] p 47 N83-10610
Primary calibration of high efficiency solar cells A comparison of 1980 data from CNES, Nasa (Lewis), JPL and RAE p 64 N83-14717
Announcement of an opportunity for space calibration of solar cells p 65 N83-14719
- CALIFORNIA**
Intermediate photovoltaic system application experiment operational performance report for CDC Light Manufacturing Building, San Bernardino, California [DE82-020883] p 56 N83-13599
Operating and maintenance experience with a 6-kW wind energy conversion system at Naval Station, Treasure Island, California [AD-A119389] p 136 N83-14740
- CALORIMETERS**
An oxygen flow calorimeter for determining the heating value of kilogram size samples of municipal solid waste p 87 N83-10580
Lithium-sulfur dioxide (Li/SO₂) battery safety hazards Thermal studies [AD-A119381] p 163 N83-13591
- CAPACITANCE**
Superconducting-transmission-line project at the Los Alamos National Laboratory [DE82-021835] p 158 N83-12344
- CAPACITORS**
Protection of large capacitor banks [DE82-017353] p 120 N83-10366
Proceedings of a Symposium on High Energy Density Capacitors and Dielectric Materials [PB82-197344] p 160 N83-10373
- CAPACITY**
Expected cycle life versus depth of discharge relationships of well behaved single cells and cell strings [NASA-TM-82957] p 160 N83-10558
- CAPILLARY TUBES**
The effect of the parameters of metal-fiber capillary structures on the maximum heat-transfer capability of thermal pipes p 156 A83-11515
- CARBON**
Physical and chemical characterization of devonian gas shale [DE82-002560] p 111 N83-15802
- CARBON DIOXIDE**
Liquid-vapor equilibrium for ternary natural gas system [PB82-227679] p 82 N83-10160
Proceedings of the conference on energy conservation: Retrofit of Municipal Wastewater Treatment Facilities [DE82-013710] p 5 N83-10612
- CARBON DIOXIDE LASERS**
Volatile production during preignition heating [DE82-003061] p 109 N83-15402
- CARBON DIOXIDE REMOVAL**
Methods of reducing energy consumption of the oxidant supply system for MHD/steam power plants [NASA-TM-83025] p 133 N83-13589
- CARBON MONOXIDE**
Combustion characteristics of hydrogen-carbon monoxide based gaseous fuels p 78 A83-11491

CATALYTIC ACTIVITY

- Combustion characteristics of hydrogen Carbon monoxide based gaseous fuels [NASA-TM-82998] p 76 N83-10560
Design and preparation of new, highly active Fischer-Tropsch catalysts [DE82-003670] p 105 N83-14202
- CARBON 13**
A carbon-13 and proton nuclear magnetic resonance study of some experimental reference broadened-specification /ERBS/ turbine fuels p 78 A83-11482
- CARBONATES**
The effect of thickness on the performance of molten carbonate fuel cell cathodes p 115 A83-15869
Internal reforming for natural gas fueled molten carbonate fuel cells [PB82-200676] p 128 N83-11607
Advanced high-temperature thermal energy storage media for industrial applications [DE82-000161] p 168 N83-15945
- CARRIER DENSITY (SOLID STATE)**
Field ionization of deep levels in semiconductors with applications to Hg_{1-x}Cd_x Te p-n junctions p 156 A83-16089
Theory of open circuit photo-voltage in degenerate abrupt p-n junctions p 36 A83-17767
- CARRIER INJECTION**
Changes in photovoltaic and dark electrical properties of hydrogenated amorphous silicon diodes induced by forward bias carrier injection p 34 A83-16021
- CARRIER TRANSPORT (SOLID STATE)**
Process for high photocurrent in IBC solar cells — Interdigitated Back Contact p 24 A83-12059
Solar cell device physics — Book p 27 A83-13501
Optical absorption coefficient and minority carrier diffusion length measurements in low-cost silicon solar cell material p 30 A83-13922
Schottky revisited — model limitations and steps for extending treatment to solar cell structures p 34 A83-15509
Transport mechanisms for Mg/Zn₃P₂ junctions p 35 A83-16071
- CASCADE CONTROL**
Determination of optimum sunlight concentration level in space for 3-5 cascade solar cells p 69 N83-15814
- CASE HISTORIES**
Small-scale energy-technology projects in the Pacific Territories A case-study review [DE82-001338] p 67 N83-14751
- CASES (CONTAINERS)**
Packaging of radioactive wastes for sea disposal [IAEA-TECDOC-240] p 21 N83-15114
- CASSEGRAIN ANTENNAS**
Feasibility study of solid surface subreflector production techniques [NASA-CR-169642] p 60 N83-14678
- CASSEGRAIN OPTICS**
Miniaturized Cassegrainian concentrator concept demonstration p 71 N83-15830
- CATALYSIS**
Catalytic hydrodeoxygenation of coal-derived liquids and related oxygen-containing compounds p 81 N83-10132
Evaluation of catalytic combustion of actual coal-derived gas [NASA-CR-167842] p 102 N83-13588
Impact of NO_x selective catalytic reduction processes on flue gas cleaning systems [PB82-240086] p 16 N83-13664
- CATALYSTS**
Role of tin catalysts in the hydroliquefaction of coal — hydrocracking p 81 N83-10131
Hard coal gasification using catalysts dissolved in steam [BMFT-FB-T-82-107] p 82 N83-10146
Design and preparation of new, highly active Fischer-Tropsch catalysts [DE82-003670] p 105 N83-14202
Catalyst and reactor development for a liquid-phase Fischer-Tropsch process [DE82-003369] p 105 N83-14207
- CATALYTIC ACTIVITY**
Catalytic autothermal reforming increases fuel cell flexibility p 74 A83-11794
Kinetics and catalysis of producing synthetic gases from biomass [PB82-214347] p 82 N83-10156
Laboratory research for desulfurizing and NO-reduction by addition of ammonia under the conditions of the Bergbau-Forschung flue gas desulfurizing process [BMFT-FB-T-82-147] p 9 N83-11617
Catalytic liquefaction of biomass [DE82-003329] p 108 N83-14752
Advanced fuel concepts and applications [DE82-002710] p 137 N83-15110

CATHODES

- Catalytic combustion with steam injection
[NASA-TM-82923] p 111 N83-15805
- CATHODES**
- Crude gas/air fuel cells with a phosphoric acid matrix
[BMFT-FB-T-82-167] p 128 N83-11601
- Computer simulations of reflex E-beam systems and plasma stability p 151 N83-16123
- Crater formation by high current discharges in vacuum p 152 N83-16129
- CAVES**
- Preliminary design study of compressed-air energy storage in a salt dome Volume 4 CAES turbomachinery design
[DE82-019781] p 162 N83-12561
- CAVITY RESONATORS**
- A proposed optical pumping system requiring no electric power p 143 N83-15861
- CELL ANODES**
- Oxygen evolution improvement at a Cr-doped SrTiO₃ photoanode by a Ru-oxide coating p 33 A83-15493
- Research on oxidation by air and tempering of Raney nickel electrocatalysts for the H₂ anodes of alkali combustion materials cells --- German thesis p 119 A83-18494
- CELL CATHODES**
- The effect of thickness on the performance of molten carbonate fuel cell cathodes p 115 A83-15869
- CELLULOSE**
- Gasification kinetics for biomass decomposition
[PB82-199043] p 97 N83-12256
- Design of plywood and paper flywheel rotors p 165 N83-14662
- CEMENTATION**
- Improvement of the casing cementation of deep and ultradeep wells Part 1 Drilling muds and washing fluids
[BMFT-FB-T-82-111-PT-1] p 92 N83-11364
- Improvement of casing cementation of deep and ultradeep wells Part 2 Oilfield cements and cement additives
[BMFT-FB-T-82-112-PT-2] p 93 N83-11365
- CEMENTS**
- Improvement of casing cementation of deep and ultradeep wells Part 2 Oilfield cements and cement additives
[BMFT-FB-T-82-112-PT-2] p 93 N83-11365
- An assessment of gas-side fouling in cement plants
[NASA-CR-169513] p 15 N83-13644
- CENTRIFUGES**
- Performance characteristics of heavy media cyclones using fly ash-derived heavy media p 86 N83-10574
- CERAMIC COATINGS**
- Sol-gel protective coatings for black chrome solar selective films
[DE82-004138] p 74 N83-15942
- Survey of utility load management projects Third revised report
[DE82-000888] p 169 N83-15957
- CERAMICS**
- High-temperature ceramic heat exchanger element for a solar thermal receiver p 26 A83-13476
- High-temperature ceramic heat exchanger element for a solar thermal receiver p 44 N83-10543
- Ceramic high temperature receiver design and tests p 44 N83-10544
- Garrett solar Brayton engine/generator status p 44 N83-10545
- Evaluation of solar-air-heating central-receiver concepts
[DE82-016924] p 48 N83-11586
- Advanced regenerative heat recovery system
[PB82-200650] p 8 N83-11604
- Synroc processing options --- processing nuclear reactor wastes using a titanate based ceramic
[DE82-004230] p 17 N83-13976
- A high temperature ceramic heat exchanger element for a solar thermal receiver
[NASA-CR-169625] p 58 N83-14666
- Ceramics for high power sources in space p 171 N83-15881
- Advanced high-temperature thermal energy storage media for industrial applications
[DE82-000161] p 168 N83-15945
- Evaluation of olivine ceramic refractories for thermal-energy-storage application
[DE82-000108] p 168 N83-15947
- CERIUM OXIDES**
- CMX-50 A new ultra thin solar cell cover for lightweight arrays p 66 N83-14726
- CERMETS**
- Optical properties of gold-magnesia selective cermets --- for solar collectors p 33 A83-15482
- CERTIFICATION**
- Experience with specifications applicable to certification --- of photovoltaic modules for large-scale application p 32 A83-15463

CESIUM PLASMA

- Effect of radiation and non-Maxwellian electron distribution on relaxation processes in an atmospheric cesium seeded argon plasma
[EUT-82-E-124] p 140 N83-15144

CHANNEL FLOW

- The STD/MHD codes - Comparison of analyses with experiments --- MHD generator performance prediction and tests p 116 A83-16105
- Three-dimensional fluid and electrodynamic modeling for MHD DCW channels
[AIAA PAPER 83-0464] p 117 A83-16732

CHANNELS (DATA TRANSMISSION)

- Digital image transmission and coding p 127 N83-11397

CHARACTERIZATION

- Components identified in energy-related wastes and effluents
[PB82-236985] p 101 N83-13283
- Physical and chemical characterization of devonian gas shale
[DE82-002560] p 111 N83-15802

CHARCOAL

- Laboratory research for desulfurizing and NO-reduction by addition of ammonia under the conditions of the Bergbau-Forschung flue gas desulfurizing process
[BMFT-FB-T-82-147] p 9 N83-11617

CHARGE CARRIERS

- Schottky revisited --- model limitations and steps for extending treatment to solar cell structures p 34 A83-15509

CHARGE DISTRIBUTION

- The residual voltage in fast electrophotography of a-SiH_x/x p 34 A83-15511

CHARGE EXCHANGE

- Plasma parameter measurements using neutral-particle-beam attenuation
[DE82-021120] p 132 N83-13001
- Study of the ionic distribution and of the energy deposition in a plasma of Tokamak heated by injection of fast neutrals
[EUR-CEA-FC-1094] p 155 N83-16226

CHARGED PARTICLES

- Advanced fuel concepts and applications
[DE82-002710] p 137 N83-15110

CHELATES

- Metal chelate catalysts for fuel cells
[PB82-195637] p 131 N83-12592

CHEMICAL ANALYSIS

- Standardization of sampling and analysis of geopressured fluids Part 2 Monitoring of geopressured wells p 82 N83-10151
- Analytical techniques for aromatic components in aircraft fuels
[AD-A118838] p 96 N83-12252
- Development of instrumental methods of analysis of sulfur compounds in coal process streams
[DE82-003253] p 108 N83-14775
- Development of instrumental methods of analysis of sulfur compounds in coal-process streams
[DE82-003291] p 20 N83-14776

CHEMICAL CLEANING

- Physicochemical cleaning and recovery of coal p 87 N83-10577

CHEMICAL COMPOSITION

- Tests of blending and correlation of distillate fuel properties p 78 A83-11050
- Efficiency-improvement study for GaAs solar cells
[DE82-016410] p 48 N83-11585
- Fluidized-bed pyrolysis of oil shale Oil yield, composition, and kinetics
[DE82-021010] p 97 N83-12571
- Components identified in energy-related wastes and effluents
[PB82-236985] p 101 N83-13283

CHEMICAL EQUILIBRIUM

- Computer simulation and molecular theory studies of natural gas mixtures
[PB82-22060] p 92 N83-11349

CHEMICAL FUELS

- The MHD disk generator as a multimegawatt power supply operating with chemical and nuclear sources p 141 N83-15848

CHEMICAL PROPERTIES

- Recent trends in aviation turbine fuel properties
[NASA-TP-2056] p 92 N83-11340
- Pulverized coal combustion
[DE82-002969] p 105 N83-14198

CHEMICAL REACTIONS

- Flat-plate collector research area Silicon material task p 41 N83-10519
- Thermal battery systems for ordnance fuzing
[AD-A119155] p 163 N83-13590
- Design and preparation of new, highly active Fischer-Tropsch catalysts
[DE82-003670] p 105 N83-14202

SUBJECT INDEX

- CaO interactions in the staged combustion of coal
[DE82-003273] p 105 N83-14205
- Effects of solvent composition and concentration on early liquefaction reactions
[DE82-004136] p 109 N83-15395
- Reaction kinetics and diagnostics for oil-shale retorting
[DE82-001598] p 112 N83-15952
- CHEMICAL REACTORS**
- Thermal reactor --- liquid silicon production from silane gas
[NASA-CASE-NPO-14369-1] p 75 N83-10501
- Fluidized-bed pyrolysis of oil shale Oil yield, composition, and kinetics
[DE82-021010] p 97 N83-12571
- Conversion of forest residues to a methane-rich gas in a high-throughput gasifier
[DE82-020289] p 102 N83-13601
- Catalyst and reactor development for a liquid-phase Fischer-Tropsch process
[DE82-003369] p 105 N83-14207
- Development of a polysilicon process based on chemical vapor deposition, phase 1
[NASA-CR-169633] p 59 N83-14673
- CHIPS (ELECTRONICS)**
- Planar multijunction high voltage solar cell chip p 30 A83-13923
- CHLORINATION**
- Investigation of the hydrochlorination of SiCl₄
[NASA-CR-169622] p 60 N83-14682
- CHLORINE COMPOUNDS**
- Investigation of the hydrochlorination of SiCl₄
[NASA-CR-169622] p 60 N83-14682
- CHLORINE OXIDES**
- Spectroscopic studies of the hazards of Li/SOCl₂ batteries during anode-limited cell reversal p 114 A83-12056
- CHLOROSILANES**
- Investigation of the hydrochlorination of SiCl₄
[NASA-CR-169621] p 58 N83-14668
- CHONDRULE**
- Refractory residues, condensates and chondrules from solar furnace experiments p 31 A83-15371
- CHORDS (GEOMETRY)**
- Vertical axis wind turbine program p 147 N83-15913
- CHROMIUM**
- An investigation of deposition parameter dependence of optical properties, microstructure and thermal stability of black chrome selective surfaces p 34 A83-15497
- CIRCUIT BREAKERS**
- Equidensitometrical evaluation of a film record of an SF₆ switching arc p 153 N83-16136
- CIRCUIT PROTECTION**
- Some methods to connect a windpower induction generator to the utility network
[DE82-750057] p 133 N83-13372
- CIRCULAR CYLINDERS**
- Thermal and optical analysis of an evacuated circular cylindrical concentrating collector p 29 A83-13697
- CITIES**
- Energy recovery and cogeneration from an existing municipal incinerator p 5 N83-10589
- Solar availability in cities and towns A computer model
[PB82-202201] p 49 N83-11608
- CIVIL AVIATION**
- Airline economics --- Book p 2 A83-14000
- Fuel savings in air transport p 2 A83-19150
- The impact of petroleum, synthetic and cryogenic fuels on civil aviation
[FAA-EM-82-29] p 106 N83-14291
- CLASSIFICATIONS**
- Simple anemometer for wind classification
[BMFT-FB-T-82-106] p 92 N83-10719
- CLASSIFIERS**
- Dry processing of power plant coal rich in inerts --- use of air classifier for dry upgrading of coal with high inerts content
[BMFT-FB-T-82-101] p 90 N83-10631
- CLEAN ENERGY**
- Solar thermal electricity generation - EURELIOS, the 1 MW/el/ heliostatic power plant of the European communities p 24 A83-11802
- Mathematical model for a noniterative optimization of each system for exploring solar energy p 24 A83-11849
- NO sub x emission control for heavy duty vehicles Toward meeting a 1986 standard
[PB82-183880] p 7 N83-10665
- CLEAN FUELS**
- NO sub x emission control for heavy duty vehicles Toward meeting a 1986 standard
[PB82-183880] p 7 N83-10665

SUBJECT INDEX

CLEANING

- Fossil-energy
[DE82-018269] p 86 N83-10570
Physicochemical cleaning and recovery of coal
p 87 N83-10577

CLIMATE

- Technical Conference on Climate: Africa
[WMO-596] p 170 N83-12738
The climate of Africa, including feasibility study of climate
alert system p 170 N83-12737

CLIMATOLOGY

- The satellite power system - Assessment of the
environmental impact on middle atmosphere composition
and on climate p 2 A83-14517
Determination of climatological parameters of global
radiation and direct solar radiation for horizontal, not
horizontal, fixed and normal incident radiation absorber
[BMFT-FB-T-82-070] p 48 N83-10718
Operating and maintenance experience with a 6-kW wind
energy conversion system at Naval Station, Treasure
Island, California
[AD-A119389] p 138 N83-14740

CLOSED CYCLES

- Rippling modes in the edge of a Tokamak plasma
[DE82-007724] p 125 N83-10940

CLOUDS

- Scale effects in liquefied fuel vapor dispersion
[DE82-006198] p 11 N83-12659

COAL

- Desulfurization of coal by means of the Batac-jig
[BMFT-FB-T-82-100] p 82 N83-10145
The heat capacity of coal chars p 83 N83-10206
Computer modeling of mixing and agglomeration in
coal-conversion reactors Volume 1 Model formulation
[DE82-014836] p 84 N83-10212
Development, construction, and experimental operation
of an improved chainless haulage system for drum-shearer
loaders
[BMFT-FB-T-82-102] p 158 N83-10428
Computerized, remote monitoring systems for
underground coal mines Fires and explosive
atmospheres
[PB82-221359] p 3 N83-10481
Resource targets for advanced underground coal
extraction systems
[NASA-CR-169429] p 85 N83-10503
Fossil-energy
[DE82-018269] p 86 N83-10570
Rapid analysis of mineral content of coal Development
of an on-line monitoring instrument for pyrite and ash in
coal p 86 N83-10571
Ashing properties of coal blends p 86 N83-10572
Coal preparation and testing p 86 N83-10573
Performance characteristics of heavy media cyclones
using fly ash-derived heavy media p 86 N83-10574
A systematic investigation of the organosulfur
components in coal p 86 N83-10575
Microstructure of coal p 87 N83-10576
Physicochemical cleaning and recovery of coal
p 87 N83-10577
Pneumatic stowing with lateral discharge in coal faces
with thick seams
[BMFT-FB-T-82-074] p 90 N83-10617
Dry processing of power plant coal rich in inerts — use
of air classifier for dry upgrading of coal with high inerts
content
[BMFT-FB-T-82-101] p 90 N83-10631
Development of criteria for extension of applicability of
low-emission, high-efficiency coal burners
[PB82-197153] p 93 N83-11377
Steam generator with circulating atmospheric fluidized
bed combustion
[BMFT-FB-T-82-134] p 94 N83-11586
Utilization of ANCIT plant by-products
[BMFT-FB-T-82-144] p 94 N83-11600
Liquefaction behavior of an Australian brown coal in
comparison to that of two US lignites
[DE82-021977] p 95 N83-12201
Fluidized-bed combustion Combustion of run-of-mine
coal in a 12-inch-diameter pressurized fluidized-bed
combustor
[DE82-018786] p 95 N83-12204
Evaluation of a sheathed permissible explosive charge
for open shooting in flammable atmospheres Adobe
charge program
[PB82-220732] p 103 N83-13636
Analysis of treated sludges and associated leachates
from coal-conversion facilities
[DE82-001488] p 103 N83-13650
Pulverized coal combustion
[DE82-002969] p 105 N83-14198
Particulate processes in pulverized coal flames
[DE82-003370] p 76 N83-14204
CaO interactions in the staged combustion of coal
[DE82-003273] p 105 N83-14205

- Petrographic evaluation of pyrite in the products from
two-stage coal-pyrite flotation
[DE82-003593] p 105 N83-14208
Program of basic research on the utilization of coal-water
mixture fuels
[DE82-002232] p 106 N83-14299
Expansion of coal-preparation-plant simulator
[DE82-001576] p 106 N83-14301
Automatic interpretation of MSS-LANDSAT data applied
to coal refuse site studies in southern Santa Catanna State,
Brazil
[E83-10066] p 18 N83-14575
Longwall shearer tracking system
[NASA-CASE-MFS-25717-1] p 107 N83-14607
Nuclear and coal waste disposal hampered by legal,
regulatory and technical uncertainties
[EMD-82-63] p 19 N83-14770
Boiler efficiency and emissions testing using
Refuse-Derived Fuel (RDF) and coal
[AD-A119291] p 19 N83-14772
Development of instrumental methods of analysis of
sulfur compounds in coal process streams
[DE82-003253] p 108 N83-14775
Coal fly ash disposal in the ocean An alternative worth
considering
[DE82-003835] p 20 N83-14781
Study of the formation of submicron particulates
generated by coal combustion
[DE82-003268] p 21 N83-15401
Potential for use of peat blends with coal for electric
power generation
[DE82-003634] p 110 N83-15497

COAL DERIVED GASES

- Combustion characteristics of hydrogen-carbon
monoxide based gaseous fuels p 78 A83-11491
Literature survey of properties of syngases derived from
coal
[NASA-TM-82739] p 83 N83-10208
Combustion of coal gas fuels in a staged combustor
[NASA-TM-82987] p 85 N83-10556
Evaluation of advanced combustion concepts for dry
NO sub x suppression with coal-derived, gaseous fuels
[NASA-TM-82985] p 85 N83-10557
Flash hydrolysis of coal for conversion to liquid and
gaseous fuels
[DE82-019435] p 100 N83-13197
Evaluation of catalytic combustion of actual coal-derived
gas
[NASA-CR-167842] p 102 N83-13588

COAL DERIVED LIQUIDS

- Catalytic hydrodeoxygenation of coal-derived liquids and
related oxygen-containing compounds
p 81 N83-10132
Literature survey of properties of syngases derived from
coal
[NASA-TM-82739] p 83 N83-10208
Flash hydrolysis of coal for conversion to liquid and
gaseous fuels
[DE82-019435] p 100 N83-13197
Characterization of diesel emissions from operation of
a light-duty diesel vehicle on alternate source diesel
fuels
[PB82-232448] p 101 N83-13281
Characterization of diesel emissions from operation of
a light-duty diesel vehicle on alternate source diesel
fuels
[PB82-234147] p 101 N83-13282
High-Temperature-Turbine-Technology Program Phase
2 Technology test and support studies Turbine spool
technology rig fuel-contaminant tolerance test
[DE82-020287] p 101 N83-13464

COAL GASIFICATION

- NOx results from two combustors tested on medium
BTU coal gas p 78 A83-11493
Development of newer methods for the isolation and
identification of certain components found in complex
mixtures derived from energy sources and the
determination of their toxicity via bioassay systems
[DE82-019043] p 81 N83-10140
Coal gasification of steam-soluted catalyst
[BMFT-FB-T-82-073] p 81 N83-10143
Hard coal gasification using catalysts dissolved in
steam
[BMFT-FB-T-82-107] p 82 N83-10146
Literature survey of properties of syngases derived from
coal
[NASA-TM-82739] p 83 N83-10208
Steam gasification of coal, project prototype plant
nuclear process heat. Report at the end of the reference
phase
[BMFT-FB-T-82-069] p 90 N83-10616
Prototype plant for Nuclear Process Heat (NPH),
reference phase R and D work on Hydrogenated Coal
Gasification (HCG) Further operation of semi-industrial
plant for hydrogenated coal gasification
[BMFT-FB-T-82-098] p 90 N83-10625

COAL UTILIZATION

- State-of-the-art of acoustic instrumentation for
coal-conversion plants
[DE82-004037] p 96 N83-12254
Coal to methanol feasibility study Beluga methanol
project. Volume 4. Environmental
[DE82-006057] p 10 N83-12542
Measurement of high-temperature high-pressure
processes A summary report
[PB82-196932] p 98 N83-12667
Basic engineering of a 10 t/hr prototype plant for the
Vereinigte Elektrizitätswerke Westfalen (VEW) coal
conversion process
[BMFT-FB-T-82-114] p 101 N83-13378
High-Temperature-Turbine-Technology Program Phase
2 Technology test and support studies Turbine spool
technology rig fuel-contaminant tolerance test
[DE82-020287] p 101 N83-13464
Great Plains Gasification Project
[DE82-019500] p 103 N83-13605
Reaction-induced temperature deviations during coal
devolatilization in a heated grid
[DE82-003864] p 106 N83-14300
Advanced concepts The second generation of
compressed air-energy storage technology
[DE82-003838] p 167 N83-14755
Corrosion in fractionation systems
[DE82-001441] p 109 N83-15427
Analysis of preburn three-dimensional flow patterns in
underground coal conversion
[DE82-002405] p 110 N83-15496

COAL LIQUEFACTION

- Role of tin catalysts in the hydrolification of coal —
hydrocracking p 81 N83-10131
Development of newer methods for the isolation and
identification of certain components found in complex
mixtures derived from energy sources and the
determination of their toxicity via bioassay systems
[DE82-019043] p 81 N83-10140
Investigation of extracts by fluidized bed extraction
[BMFT-FB-T-82-068] p 81 N83-10142
Literature survey of properties of syngases derived from
coal
[NASA-TM-82739] p 83 N83-10208
The joint Australia/Federal Republic of Germany
feasibility study on the conversion of Australian coals into
liquid fuels in Australia
[BMFT-FB-T-82-133] p 94 N83-11595
Liquefaction behavior of an Australian brown coal in
comparison to that of two US lignites
[DE82-021977] p 95 N83-12201
State-of-the-art of acoustic instrumentation for
coal-conversion plants
[DE82-004037] p 96 N83-12254
Stress-corrosion studies in coal-liquefaction
environments
[DE82-001464] p 100 N83-13240
Health effects research in direct coal liquefaction
Studies of H-coal distillates Phase 1 PDU samples,
the effects of hydrotreatment
[DE82-003702] p 18 N83-14302
Effects of solvent composition and concentration on
early liquefaction reactions
[DE82-004136] p 109 N83-15395
Modification of feed/effluent flow work exchangers for
slurry service and power recovery in coal liquefaction
processes
[DE82-004114] p 110 N83-15499

COAL UTILIZATION

- NOx formation experiments in an MHD simulation
facility p 116 A83-16103
Toroidal flow coal-fired MHD combustor design study
and tests
[AIAA PAPER 83-0467] p 118 A83-16734
Remote sensing of coal-fired MHD by optical diagnostic
techniques
[AIAA PAPER 83-0469] p 80 A83-16736
Fluidized-bed combustion Combustion of run-of-mine
coal in a 12-inch-diameter pressurized fluidized-bed
combustor
[DE82-018786] p 95 N83-12204
Materials technology for coal-conversion processes
[DE82-004036] p 96 N83-12253
Development of high temperature turbine subsystem
technology to a technology readiness status, phase 2
[DE82-003222] p 129 N83-12437
Technology and Soviet energy availability: Summary
[OTA-ISC-154] p 13 N83-13584
Sampling for high-molecular-weight organic compounds
in power plant stack gases
[PB82-234618] p 16 N83-13659
Volatile production during preignition heating
[DE82-003061] p 109 N83-15402
Potential for use of peat blends with coal for electric
power generation
[DE82-003634] p 110 N83-15497

COASTAL WATER

- Coal fly ash disposal in the ocean An alternative worth considering [DE82-003835] p 20 N83-14781

COATINGS

- Photovoltaic module encapsulation design and materials selection, volume 1, abndged [NASA-CR-169372] p 45 N83-10553
Anti-static coat for solar arrays p 67 N83-14738
Development of improved separators for alkaline zinc batteries [AD-A119150] p 166 N83-14743
Flat plate solar collectors [BMFT-FB-T-82-139] p 68 N83-14764

COBALT COMPOUNDS

- Electrochemical determination of Gibbs energies of formation of cobalt and nickel sulfides [PB82-177304] p 119 N83-10159

CODING

- Alternative electric generation impact simulator [PB82-180324] p 3 N83-10302
Digital image transmission and coding p 127 N83-11397

COEFFICIENT OF FRICTION

- Determination of friction coefficients on several distant heat pipe sections with different sliding partners --- static friction measurement of flat bearings [BMFT-FB-T-82-095] p 158 N83-10397

COGENERATION

- A 400-kWe high-efficiency steam turbine for industrial cogeneration p 43 N83-10537
Small-scale waste-to-energy systems A state-of-the-art report p 4 N83-10583
Energy recovery and cogeneration from an existing municipal incinerator p 5 N83-10589
On the 40KW test power plant modification and development, phase 2 [PB82-216102] p 122 N83-10637
Cogeneration Energy Systems assessment Volume 2 Technical discussion [PB82-200692] p 8 N83-11609
Solar cogeneration [DE82-019085] p 57 N83-13604

COLLIMATION

- Helios movable Hartmann ball [DE82-000756] p 155 N83-16220

COLLISIONLESS PLASMAS

- High-n collisionless ballooning modes in axisymmetric toroidal plasmas [DE82-002831] p 154 N83-16217

COLOR INFRARED PHOTOGRAPHY

- The use of near color infrared photography to assess the impact of the oil and natural gas industry on Louisiana's wetlands p 1 A83-10069
Environmental monitoring of the Athabasca Oil Sands Region p 80 A83-14238

COLUMNS (PROCESS ENGINEERING)

- Corrosion in fractionation systems [DE82-001441] p 109 N83-15427

COMBINED CYCLE POWER GENERATION

- Development of high temperature turbine subsystem technology to a technology readiness status, phase 2 [DE82-003222] p 129 N83-12437

COMBUSTION

- Biomass fuels update TVAs biomass fuels program [DE82-904990] p 89 N83-10613
Development of criteria for extension of applicability of low-emission, high-efficiency coal burners [PB82-197153] p 93 N83-11377
Population hazards resulting from the combustion of fossil fuels and the nuclear power industry [BLL-RISLEY-TR-4173-(9091 9)] p 11 N83-12594
Commercialization of a pulse combustion furnace with ultrahigh efficiency [PB82-243809] p 12 N83-13217
Symposium on Pulse-Combustion Applications Volume 1 Proceedings [PB82-240060] p 159 N83-13310
Diesel combustion analysis using rapid sampling techniques [AD-A119658] p 104 N83-14192
Pulverized coal combustion [DE82-002969] p 105 N83-14198
Lithium/sulfur dioxide cell and battery safety [NASA-RP-1099] p 135 N83-14684

COMBUSTION CHAMBERS

- Combustion characteristics of hydrogen-carbon monoxide based gaseous fuels p 78 A83-11491
NOx results from two combustors tested on medium BTU coal gas p 78 A83-11493
An experimental study and modeling of heat transfer in boilers of small and medium power --- French thesis p 80 A83-15841
Toroidal flow coal-fired MHD combustor design study and tests [AIAA PAPER 83-0467] p 118 A83-16734

- Multifuel evaluation of rich/lean combustor [NASA-TM-82986] p 86 N83-10559

- Combustion characteristics of hydrogen Carbon monoxide based gaseous fuels [NASA-TM-82998] p 76 N83-10560

- Symposia on Pulse-Combustion Applications and Condensing Heat Exchangers [PB82-184086] p 91 N83-10641

- Fluidised-bed combustion Combustion of run-of-mine coal in a 12-inch-diameter pressurized fluidised-bed combustor [DE82-018786] p 95 N83-12204

- Commercialization of a pulse combustion furnace with ultrahigh efficiency [PB82-243809] p 12 N83-13217

COMBUSTION EFFICIENCY

- Combustion of coal gas fuels in a staged combustor [NASA-TM-82987] p 85 N83-10558
Sewage sludge as a supplementary utility boiler fuel p 88 N83-10590

COMBUSTION PHYSICS

- Evaluation of catalytic combustion of actual coal-derived gas [NASA-CR-167842] p 102 N83-13588
NASA Lewis Research Center combustion MHD experiment p 141 N83-15847

COMBUSTION PRODUCTS

- Combustion characteristics of hydrogen-carbon monoxide based gaseous fuels p 78 A83-11491
NOx results from two combustors tested on medium BTU coal gas p 78 A83-11493
Soot formation in synfuels [DE82-004271] p 94 N83-12199
Atmosphere-biosphere interactions Toward a better understanding of the ecological consequences of fossil fuel combustion [PB82-182098] p 12 N83-12672
High-Temperature-Turbine-Technology Program Phase 2 Technology test and support studies Turbine spool technology ng fuel-contaminant tolerance test [DE82-020287] p 101 N83-13464
Study of the formation of submicron particulates generated by coal combustion [DE82-003268] p 21 N83-15401

COMMERCE

- Airline economics --- Book p 2 A83-14000
Study of the possibilities of more rational use of energy in the sector of trade and commerce, part 2 [BMFT-FB-T-82-077-PT-2] p 7 N83-11591

COMMERCIAL AIRCRAFT

- Economic modeling of fault tolerant flight control systems in commercial applications p 1 A83-11156

COMMERCIAL ENERGY

- Developing technologies for synthetic fuels p 78 A83-10658
Study of the possibilities of more rational use of energy in the sector of trade and commerce, part 1 [BMFT-FB-T-82-076-PT-1] p 5 N83-10618
Cogeneration Energy Systems assessment. Volume 2 Technical discussion [PB82-200692] p 8 N83-11609

COMMUNICATION NETWORKS

- Survey of utility load management projects Third revised report [DE82-000888] p 169 N83-15957

COMMUNICATION SATELLITES

- Advanced ngid array --- satellite solar arrays p 62 N83-14697
ARABSAT solar array p 66 N83-14733

COMMUTATION

- A lightweight electronically commutated dc motor for electric passenger vehicles [NASA-CR-165601] p 119 N83-10348

COMPARISON

- Liquefaction behavior of an Australian brown coal in comparison to that of two US lignites [DE82-021977] p 95 N83-12201

COMPLEX COMPOUNDS

- Development of newer methods for the isolation and identification of certain components found in complex mixtures derived from energy sources and the determination of their toxicity via bioassay systems [DE82-019043] p 81 N83-10140

COMPOSITE MATERIALS

- Composite-material flywheels and containment systems p 161 N83-11017
Advanced high-temperature thermal energy storage media for industrial applications [DE82-000161] p 168 N83-15945

COMPOSITE STRUCTURES

- Design and fabrication of composite blades for the Mod-1 wind turbine generator [NASA-CR-167987] p 128 N83-11579

COMPOSTING

- Proceedings of the conference on energy conservation Retrofit of Municipal Wastewater Treatment Facilities [DE82-013710] p 5 N83-10612

COMPRESSED AIR

- Preliminary design study of compressed-air energy storage in a salt dome Volume 4 CAES turbomachinery design [DE82-019781] p 162 N83-12561
Preliminary design study of underground pumped hydro and compressed-air energy storage in hard rock Volume 8 Design approaches - UPH Appendix B Shafts [DE81-028202] p 164 N83-13607
Compressed-air energy storage preliminary design and site-development program in an aquifer Volume 1 Executive summary [DE82-019284] p 164 N83-13610
Compressed-air energy storage preliminary design and site-development program in an aquifer Volume 2: Utility-system planning [DE82-019993] p 164 N83-13611
Aquifer stability investigation [DE82-003831] p 166 N83-14754
Advanced concepts The second generation of compressed air-energy storage technology [DE82-003838] p 167 N83-14755
Environmental and regulatory aspects of compressed-air energy storage [DE82-003868] p 19 N83-14757
Economic comparison of CAES designs employing hardrock, salt and aquifer storage reservoirs [DE82-003833] p 167 N83-14758

COMPRESSED GAS

- Assessment of research and development needs for methane fueled engine systems [PB82-199035] p 97 N83-12257

COMPRESSORS

- Positive displacement rotary vapor compressor for vapor compression --- for waste steam utilization [PB82-227620] p 3 N83-10429

COMPUTATIONAL FLUID DYNAMICS

- Momentum theory, dynamic inflow, and the vortex-ring state p 116 A83-16026
Mathematical model for the analysis of wind-turbine wakes p 117 A83-16108
Transient flow analysis of the AEDC/HPDE MHD generator [AIAA PAPER 83-0395] p 117 A83-16691

COMPUTER AIDED DESIGN

- CAEDS Computer-aided engineering and architectural design system [AD-A117972] p 170 N83-11794
Numerical simulation of fluid flow in porous/fractured media [DE82-002631] p 107 N83-14454

COMPUTER GRAPHICS

- Large-area sheet task advanced dendritic web growth development [NASA-CR-169639] p 59 N83-14669

COMPUTER PROGRAMMING

- Expansion of coal-preparation-plant simulator [DE82-001576] p 106 N83-14301

COMPUTER PROGRAMS

- Transient performance of evacuated tubular solar collectors p 27 A83-13478
Fusion reactor plasma-performance modeling POPCON analysis [DE82-016364] p 126 N83-10943
Simulation of thermal aspects of residential photovoltaic systems [DE82-020399] p 51 N83-12555
Ti-59 program for calculating the annual energy requirements for residential heating and cooling. Volume 1 Users manual [DE82-010174] p 13 N83-13594
Ti-59 program for calculating the annual energy requirements for residential heating and cooling. Volume 2 Program reference manual [DE82-020275] p 13 N83-13595
Computer-simulation code for the prediction of reliability and available capacity of modular energy-storage arrays Volume 1 Overview [DE82-906445] p 164 N83-13618
A reference-material system for estimating health and environmental risks of selected material cycles and energy systems [DE82-019309] p 15 N83-13647
Analytical and numerical calculations of field-reversed Theta-pinch equilibria based on a generalized Hill's vortex model [DE82-003150] p 139 N83-15139
Resistive MHD studies of high-beta-Tokamak plasmas [DE82-001478] p 139 N83-15141
Mathematical modeling of TES subsystems [DE82-000168] p 168 N83-15950

SUBJECT INDEX

- Energy balance in TM-1-MH Tokamak (ohmic heating) p 151 N83-16122
Numerical simulation of collective ion acceleration p 152 N83-16127
- COMPUTER SYSTEMS DESIGN**
Computer management of geologic and petroleum data at the North Dakota Geological Survey [DE82-904385] p 103 N83-13694
Energy policy formulation in South Africa. APL as a tool to identify options p 20 N83-14968
- COMPUTER TECHNIQUES**
Computerized, remote monitoring systems for underground coal mines Fires and explosive atmospheres [PB82-221359] p 3 N83-10481
Energy policy formulation in South Africa. APL as a tool to identify options p 20 N83-14968
- COMPUTERIZED SIMULATION**
A design method for closed loop solar energy systems with concentrating collectors p 28 A83-13583
Power conditioning in an autonomous system controlled by a microprocessor Simulation of use with a photovoltaic generator — French thesis p 30 A83-13807
The STD/MHD codes - Comparison of analyses with experiments — MHD generator performance prediction and tests p 116 A83-16105
A parametric analysis of the performances of a linear collectors' network of a solar power plant p 36 A83-18139
An assessment of wind energy resource for northwestern California p 80 A83-18456
Computerized simulation of the dynamic response of a coal-fired power plant with pressurized fluidized bed [BMFT-FB-T-82-094] p 90 N83-10629
Computer simulation and molecular theory studies of natural gas mixtures p 92 N83-11349
Simulation of thermal aspects of residential photovoltaic systems [DE82-020399] p 51 N83-12555
ROSET A solar-thermal electric-power simulation users guide [DE82-021997] p 53 N83-12567
Electrical aspects of photovoltaic-system simulation [DE82-021956] p 53 N83-12568
Comparative analysis of economic models in selected solar energy computer programs [PB82-164995] p 55 N83-12589
Computer-simulation code for the prediction of reliability and available capacity of modular energy-storage arrays Volume 1 Overview p 164 N83-13618
Expansion of coal-preparation-plant simulator [DE82-001576] p 106 N83-14301
Multidimensional MHD computations for the field-reversed theta pinch and the reversed-field pinch [DE82-004361] p 139 N83-15142
An efficient fully implicit simulator [CSS-126] p 109 N83-15322
Computer simulations of reflex E-beam systems and plasma stability p 151 N83-16123
Numerical simulation of collective ion acceleration p 152 N83-16127
Numerical simulation of the interaction of an electromagnetic wave with an inhomogeneous plasma p 154 N83-16140
- COMPUTERS**
Solar availability in cities and towns A computer model [PB82-202201] p 49 N83-11608
- CONCENTRATION (COMPOSITION)**
Microdistribution of oxygen in silicon and its effects on electronic properties p 71 N83-15825
- CONCENTRATORS**
A methodology of evaluation and design of fields of focusing heliostats — French thesis p 24 A83-11768
Thermal response of solar receiver aperture plates during sun walk-off [ASME PAPER 82-HT-33] p 25 A83-12791
A design method for closed loop solar energy systems with concentrating collectors p 28 A83-13583
A study of different techniques for cooling solar cells in centralized concentrator photovoltaic power plants — French thesis p 30 A83-14109
Automatic methods for the adjustment of faceted solar-energy concentrators and heliostats p 31 A83-15131
Studies on radiation intensity distribution in the focus of compound parabolic concentrators p 38 A83-18565
Prospects for the construction of solar furnaces for industry p 38 A83-19236
Parabolic Dish Solar Thermal Power Annual Program Review, proceedings [NASA-CR-169365] p 42 N83-10525

- Development status of the PDC-1 Parabolic Dish Concentrator p 42 N83-10526
Aurex Parabolic Dish Concentrator (PDC-2) p 42 N83-10527
The PKI collector p 42 N83-10528
Thin film concentrator panel development p 42 N83-10529
A transmittance-optimized, point-focus Fresnel lens solar concentrator p 42 N83-10530
Design and development of a high-concentration photovoltaic concentrator [DE82-015673] p 48 N83-10597
General introduction to wind energy conversion [NLR-MP-81014-U] p 130 N83-12527
High-intensity solar cells [DE82-020420] p 51 N83-12550
The swing to concentrator arrays — solar arrays p 61 N83-14695
Optimization of silicon solar cells for solar generators with concentration p 63 N83-14707
Miniaturized Cassegrainian concentrator concept demonstration p 71 N83-15830
- CONCENTRIC CYLINDERS**
Optical analysis of solar energy tubular absorbers p 25 A83-12596
- CONDENSATES**
Refractory residues, condensates and chondrules from solar furnace experiments p 31 A83-15371
- CONDENSING**
Heat pipe thermal switch [NASA-CASE-GSC-12812-1] p 159 N83-12525
Symposium on Condensing Heat Exchangers Volume 2 Proceedings [PB82-240078] p 159 N83-13311
Two-phase heat transport for thermal control p 159 N83-15894
- CONDUCTION ELECTRONS**
Valency control of glow discharge produced a-SiC:H and its application to heterojunction solar cells p 28 A83-13649
- CONFERENCES**
Thermal infrared sensing applied to energy conservation in building envelopes /Thermosense IV/, Proceedings of the Meeting, Ottawa, Ontario, Canada, September 1-4, 1981 p 2 A83-12686
International Conference on Energy Storage, Brighton, Sussex, England, April 29-May 1, 1981, Proceedings p 160 A83-14045
Commercial Photovoltaics Measurements Workshop, Vail, CO, July 27-29, 1981, Proceedings p 32 A83-15452
Advances in energy technology; Proceedings of the Eighth Annual UMR-DNR Conference on Energy, University of Missouri-Rolla, Rolla, MO, November 4-7, 1981 p 169 A83-17115
Heat Transfer and Fluid Mechanics Institute, Meeting, 28th, California State University, Sacramento, CA, June 28, 29, 1982, Proceedings p 37 A83-18451
Flat Plate Solar Array Project. Proceedings of the 20th Project Integration Meeting [NASA-CR-169370] p 39 N83-10505
Proceedings of the US Department of Energy/Argonne National Laboratory Contractors' Research and Development Workshop Converting Waste to Energy [DE82-014337] p 87 N83-10578
Seminar on Accelerated Hydroelectric Development in India. Proceedings, volume 1 [PB82-217753] p 122 N83-10634
Seminar on Accelerated Hydroelectric Development in India. Post session proceedings, volume 2 [PB82-217761] p 122 N83-10635
Symposia on Pulse-Combustion Applications and Condensing Heat Exchangers [PB82-184086] p 91 N83-10641
US-Japan Workshop on Burning Plasma Physics and Engineering [IPPI-593] p 124 N83-10921
Wind Energy Conversion Devices [VKI-LS-1981-8] p 130 N83-12526
Technical Conference on Climate Africa [WMO-596] p 170 N83-12736
Symposium on Pulse-Combustion Applications Volume 1 Proceedings [PB82-240060] p 159 N83-13310
Symposium on Condensing Heat Exchangers. Volume 2 Proceedings [PB82-240078] p 159 N83-13311
Heat Storage and Heat Pumps [PB82-226481] p 163 N83-13415
Proceedings of the 3rd Conference on Waste Heat Management and Utilization [PB82-227901] p 17 N83-13669
Photovoltaic Generators in Space — conference [ESA-SP-173] p 61 N83-14694

- CONTROLLERS**
Proceedings of the AFOSR Special Conference on Prime-Power for High Energy Space Systems, volume 1 [AD-A118887] p 140 N83-15841
Fifth Biennial Wind Energy Conference and Workshop (WW5) [DE82-014659] p 146 N83-15908
Eleventh Czechoslovak Seminar on Plasma Physics and Technology [IPPCZ-244] p 150 N83-16114
- CONGRESSIONAL REPORTS**
Acid rain CZMA [GPO-91-371] p 8 N83-11611
Energy conservation strategy for the 1980's [GPO-86-217] p 10 N83-12521
Secretary's report to Congress Secretary's statement, program review and outlook [DE82-021878] p 10 N83-12581
Technology and Soviet energy availability Summary [OTA-ISC-154] p 13 N83-13584
Aircraft thrust/power management can save defense fuel, reduce engine maintenance costs, and improve readiness [GAO/PLRD-82-74] p 18 N83-14074
Cleaning up the environment Progress achieved but major unresolved issues remain [GAO/CED-82-72] p 19 N83-14767
- CONSTRAINTS**
Operational considerations on the moon-day project p 38 A83-19148
- CONTAINMENT**
Composite-material flywheels and containment systems p 161 N83-11017
- CONTAMINANTS**
Sampling for high-molecular-weight organic compounds in power plant stack gases [PB82-234618] p 16 N83-13659
Study of the formation of submicron particulates generated by coal combustion [DE82-003268] p 21 N83-15401
Cold crucible Czochralski for solar cells p 70 N83-15824
- CONTINENTAL SHELVES**
Southern California offshore air quality model validation study Volume 1 Executive summary — oil exploration pollution impact [PB82-190711] p 9 N83-11631
Southern California offshore air quality model validation study Volume 2 Synthesis of findings [PB82-190729] p 9 N83-11632
Geological studies of the COST numbers G-1 and G-2 wells, United States north Atlantic outer continental shelf [USGS-CIRC-861] p 94 N83-11638
- CONTINUOUS WAVE LASERS**
CW-laser annealed solar cells p 23 A83-10638
- CONTRACT NEGOTIATION**
Sacramento Municipal Utility District 100-MW sub e photovoltaic plant p 40 N83-10513
- CONTRACTS**
Contracts for field projects and supporting research on enhanced oil recovery and improved drilling technology [DE82-002598] p 111 N83-15803
- CONTROL**
Radial effects in heating and thermal stability of a sub-ignited Tokamak [DE82-009384] p 124 N83-10932
- CONTROL EQUIPMENT**
Attempt to determine the power demand of a helicopter control system on the basis of flight tests p 1 A83-10439
Fusion Energy Division automation of the ISX-B neutral beams [DE82-016369] p 132 N83-13008
- CONTROL STABILITY**
Multivariable stability-margin optimisation with decoupling and output regulation p 2 A83-16191
- CONTROL SURFACES**
Control systems for horizontal-axis wind turbines p 130 N83-12532
- CONTROL VALVES**
Use of thermocapillary migration in a controllable heat valve p 156 A83-16093
- CONTROLLED FUSION**
Physics (selected articles) [AD-A119830] p 154 N83-16143
Perform experiments on LINUS-O and LTX imploding liquid liner fusion systems [AD-A120052] p 154 N83-16214
Authors guide to publishing in the fields of plasma physics and controlled fusion [DE82-002866] p 155 N83-16230
- CONTROLLERS**
A lightweight electronically commutated dc motor for electric passenger vehicles [NASA-CR-165601] p 119 N83-10348

CONVECTIVE FLOW

- Improved transistorized AC motor controller for battery powered urban electric passenger vehicles
[NASA-CR-167978] p 120 N83-10349
- Improved SCR ac motor controller for battery powered urban electric vehicles
[NASA-CR-167919] p 169 N83-16257
- ### CONVECTIVE FLOW
- Investigation of free-forced convection flows in cavity-type receivers
[DE82-020118] p 49 N83-12386
- ### CONVECTIVE HEAT TRANSFER
- An experimental investigation of convective losses from solar receivers
[JULU-ENG-81-4003] p 39 N83-10500
- ### CONVEYORS
- Investigation of engineering and design considerations in selecting conveyors for densified Refuse-Derived Fuel (dRDF) and dRDF Coal mixtures
[AD-A119065] p 107 N83-14495
- ### COOLING
- An experimental study of single medium thermocline thermal energy storage
[ASME PAPER 82-HT-53] p 26 A83-12800
- Intermediate photovoltaic system application experiment operational performance report. Volume 7 Beverly High School, Beverly, Mass
[DE82-015790] p 46 N83-10607
- Heat pipe thermal switch
[NASA-CASE-GSC-12812-1] p 159 N83-12525
- Photovoltaic balance-of-system assessment
[DE82-906429] p 57 N83-13622
- A comparison of unglazed flat plate liquid solar collector thermal performance using the ASHRAE Standard 98-1980 and modified BSE test procedures
[PB82-237660] p 58 N83-13632
- Miniaturized Cassegrainian concentrator concept demonstration p 71 N83-15830
- ### COOLING SYSTEMS
- Cryo-cooler development for space flight applications p 114 A83-13460
- A study of different techniques for cooling solar cells in centralized concentrator photovoltaic power plants --- French thesis p 30 A83-14109
- Refrigeration system of superconducting generators for large power plants
[BMFT-FB-T-82-071] p 120 N83-10369
- Results of testing a development module of the second-generation E-systems concentrating photovoltaic-thermal module
[DE82-015871] p 46 N83-10598
- Two-phase heat transport for thermal control p 159 N83-15894
- ### COORDINATES
- An experimental study of an aerodynamically optimum windmill
[NAL-TR-698] p 129 N83-12522
- ### COPOLYMERS
- Polyvinyl alcohol membranes as alkaline battery separators
[NASA-TM-82961] p 119 N83-10135
- ### COPPER
- Development of technique for AR coating nickel and copper metallization of solar cells FPS project product development
[NASA-CR-169616] p 60 N83-14679
- Cold crucible Czochralski for solar cells p 70 N83-15824
- Microstructural analysis of solar cell welds p 72 N83-15833
- ### COPPER SULFIDES
- Use of test structures in the production of CdS/Cu₂S photovoltaic devices p 32 A83-15455
- Heat-treatment studies on thin-film CdS/Cu₂S solar cells p 35 A83-16084
- Electrophoretic CdS/Cu₂S solar cells for space applications p 63 N83-14704
- ### CORE SAMPLING
- Development of new and improvement of existing core recovery methods
[BMFT-FB-T-82-091] p 91 N83-10705
- ### CORROSION
- Materials technology for coal-conversion processes
[DE82-004036] p 96 N83-12253
- Corrosion in fractionation systems p 109 N83-15427
- Corrosion tests in the Marchwood geothermal borehole
[AERE-G-2225] p 112 N83-15959
- ### CORROSION RESISTANCE
- Operational experience on MP-200 series commercial wind turbine generators p 147 N83-15917
- ### CORROSION TESTS
- Corrosion tests in the Marchwood geothermal borehole
[AERE-G-2225] p 112 N83-15959

COST ANALYSIS

- Approach to Nitinol power plant cost analysis p 112 A83-10656
- Aerodynamic platform comparison for jet-stream electricity generation p 116 A83-16102
- Economic efficiency in the sizing of residential heat pumps
[PB82-179029] p 3 N83-10401
- Conceptual design and cost analysis of hydraulic output unit for 15 kW free-piston Stirling engine
[NASA-CR-165543] p 121 N83-10561
- Research, development, and demonstration of advanced lead-acid batteries for utility load leveling
[DE82-019796] p 162 N83-11584
- Analytical mode for interim expansion of electrical energy generating systems
[INPE-2558-TDL/104] p 129 N83-12520
- Total energy food plant 21 million gallon ethanol facility
[DE82-019258] p 14 N83-13617
- Nuclear and coal waste disposal hampered by legal, regulatory and technical uncertainties p 19 N83-14770
- Risks, regulation responsibilities and costs in nuclear waste management. A preliminary survey in the European Community
[EUR-6893] p 21 N83-15115
- ### COST EFFECTIVENESS
- The dynamic inducer as a cost-effective wind turbine system p 118 A83-18457
- PV large systems project p 40 N83-10512
- Aerodynamics and performance testing of the VAWT
[DE82-003574] p 137 N83-14760
- ### COST ESTIMATES
- An economic evaluation of solar energy p 45 N83-10549
- Analytical mode for interim expansion of electrical energy generating systems
[INPE-2558-TDL/104] p 129 N83-12520
- Price estimates for the production of wafers from silicon ingots
[NASA-CR-169517] p 55 N83-13583
- Evaluation of estimated energy conservation measure costs and benefits in the residential multifamily sector
[DE82-000490] p 14 N83-13606
- ### COST REDUCTION
- Aircraft thrust/power management can save defense fuel, reduce engine maintenance costs, and improve readiness
[GAO/PLRD-82-74] p 18 N83-14074
- Conceptual design of the 7 megawatt MOD-5B wind turbine generator p 147 N83-15920
- ### COUNTERFLOW
- An experimental study of fuel combustion in a high-temperature air counterflow p 79 A83-14056
- ### COVERINGS
- Development of large scale production methods for components of solar energy collection Transparent glass covers and their connection to the collector system
[BMFT-FB-T-82-083] p 47 N83-10622
- Textured solar cell covers for light weight and high performance p 66 N83-14728
- ### CRACK PROPAGATION
- PV module degradation-analysis
[DE82-021123] p 53 N83-12570
- ### CRASHES
- Antismoking kerosene atomization and flammability
[NASA-CR-169385] p 95 N83-12246
- ### CROP GROWTH
- Biomass fuels update TVAs biomass fuels program
[DE82-904990] p 89 N83-10613
- ### CROSS FLOW
- Some innovative concepts in wind turbines of the axial-flow, cross-flow, and combined (dual) flow types p 149 N83-15935
- ### CROSSLINKING
- Development and evaluation of polyvinyl-alcohol blend polymer films as battery separators
[NASA-TM-82981] p 167 N83-15372
- ### CRUCIBLES
- Cold crucible Czochralski for solar cells p 70 N83-15824
- ### CRUDE OIL
- Applications of remote sensing to petroleum exploration p 77 A83-10030
- Exploration for fractured petroleum reservoirs using radar/Landsat merge combinations p 77 A83-10031
- Studies related to the deep earth gas
[PB82-227653] p 84 N83-10213
- Aviation turbine fuels. An assessment of alternatives
[NASA-CR-169395] p 84 N83-10214
- Program guide to used oil recycling p 104 N83-14178
- ### CRYOGENIC COOLING
- Cryo-cooler development for space flight applications p 114 A83-13460

SUBJECT INDEX

CRYOGENIC EQUIPMENT

- Aging of small cryogenic heat pipes
[SABCA-JPM/LN/H05/N28] p 159 N83-13248
- ### CRYSTAL DEFECTS
- Analysis of defect structure in silicon Characterization of samples from UCP ingot 5848-13C
[NASA-CR-169617] p 60 N83-14680
- Defects and annealing studies in 1-Me electron irradiated (AlGa)As-GaAs solar cells p 70 N83-15822
- ### CRYSTAL GROWTH
- Large-area silicon sheet task p 41 N83-10520
- Efficiency-improvement study for GaAs solar cells
[DE82-016410] p 48 N83-11585
- Large-area sheet task advanced dendritic web growth development p 58 N83-14665
- Large-area sheet task advanced dendritic web growth development
[NASA-CR-169639] p 59 N83-14669
- Large-area sheet task advanced dendritic web growth development
[NASA-CR-169637] p 59 N83-14675
- Stress studies in EPG
[NASA-CR-169640] p 60 N83-14677
- Cold crucible Czochralski for solar cells p 70 N83-15824
- Microdistribution of oxygen in silicon and its effects on electronic properties p 71 N83-15825
- Radiation damage and annealing in large area n + / p / p + GaAs shallow homojunction solar cells p 71 N83-15826
- Grown-in defects and defects produced by 1-Me electron irradiated in Al_{0.3}Ga_{0.7}As P-N junction solar cells p 71 N83-15828
- ### CRYSTAL STRUCTURE
- Large-area silicon sheet task p 41 N83-10520
- Development of a polysilicon process based on chemical vapor deposition, phase 1
[NASA-CR-169633] p 59 N83-14673
- ### CURRENT DENSITY
- Loading schemes for a 50 MWth diagonally connected MHD generator p 113 A83-10659
- Deep discharge reconditioning and shorted storage of batteries --- nickel cadmium batteries
[NASA-CR-167953] p 120 N83-10502
- Crater formation by high current discharges in vacuum p 152 N83-16129
- ### CURRENT DISTRIBUTION
- On the optimization of magnetic field sources in electromechanical energy conversion p 112 A83-10641
- Development of current sheet on output of coaxial gun p 152 N83-16125
- ### CURRENT REGULATORS
- Loading schemes for a 50 MWth diagonally connected MHD generator p 113 A83-10659
- ### CURVED PANELS
- Development effort of Sheet Molding Compound (SMC) parabolic trough panels
[DE82-000841] p 67 N83-14761
- ### CUTTERS
- Evaluation of the Kioswall longwall mining system
[DE82-015881] p 89 N83-10606
- ### CYCLES
- Expected cycle life versus depth of discharge relationships of well behaved single cells and cell strings
[NASA-TM-82957] p 160 N83-10558
- Background levels and environmental cycling of petroleum hydrocarbons Multimedia monitoring requirements p 11 N83-12630
- ### CYCLOTRON FREQUENCY
- Effect of low-frequency density fluctuations on ion-cyclotron waves
[DE82-002829] p 155 N83-16222
- ### CYLINDRICAL CHAMBERS
- Investigation of the performance of a Ford 4.1 L 6 cylinder SI engine operating on methanol iso-butanol gasoline fuel blends
[AD-A117746] p 84 N83-10426
- ### CZOCHELSKI METHOD
- Advanced Czochralski ingot growth p 40 N83-10509
- Advances in large-diameter liquid encapsulated Czochralski GaAs p 70 N83-15819
- Cold crucible Czochralski for solar cells p 70 N83-15824
- Microdistribution of oxygen in silicon and its effects on electronic properties p 71 N83-15825

D

DAMAGE

- Durability of solar collectors Experience from surveys of Swedish solar collector installations, 1979 - 1980
[PB82-188095] p 49 N83-11605

SUBJECT INDEX

DIAMONDS

DAMS

Climatic aspects of planning impoundments and hydropower operations p 99 N83-12754

DATA ACQUISITION

Data collection and analysis for geothermal research [PB82-185430] p 97 N83-12390

Intermediate photovoltaic system application experiment operational performance report. Volume 3 Beverly High School, Beverly, Massachusetts p 50 N83-12543

Data report for the Northeast Residential Experiment Station, Apr 1982 [DE82-021954] p 53 N83-12569

Hydrogeochemical and stream-sediment reconnaissance basic data for Marion, Canton, Pittsburgh and Cleveland quadrangles, Ohio; West Virginia, Pennsylvania Uranium Resource Evaluation Project [DE82-020430] p 102 N83-13553

Hydrogeochemical and stream-sediment reconnaissance basic data for Beaumont, Lake Charles and Baton Rouge quadrangles, Texas, Louisiana. Uranium Resource Evaluation Project [DE82-020438] p 102 N83-13554

Hydrogeochemical and stream-sediment reconnaissance basic data for Ogdensburg and Lake Champlain quadrangles, New York, Vermont. Uranium Resource Evaluation Project [DE82-020417] p 102 N83-13557

Hydrogeochemical and stream-sediment reconnaissance basic data for Sherman, Taxarkana, El Dorado, and Greenwood quadrangles, Oklahoma, Texas, Arkansas, Mississippi p 102 N83-13559

Residential photovoltaic experiment station data system [DE82-001646] p 68 N83-14762

ANDROMEDA. The system for the acquisition and numerical data processing and its application for experimental device Tokamak TM-1-MH p 151 N83-16120

DATA BASE MANAGEMENT SYSTEMS

Emerging technologies for the control of hazardous wastes [PB82-236993] p 17 N83-13666

DATA BASES

Quality assurance in support of energy related monitoring activities [PB82-234238] p 16 N83-13657

Evaluation of short-term NO₂ plume models for point sources Volume 1 Technical discussion [PB82-234329] p 16 N83-13658

Remote sensing applications to the development of an integrated data base for oil and gas exploration p 107 N83-14628

Value of the energy data base [DE82-014250] p 22 N83-16256

DATA MANAGEMENT

Hydrogeochemical and stream-sediment reconnaissance basic data for Sherman, Taxarkana, El Dorado, and Greenwood quadrangles, Oklahoma, Texas, Arkansas, Mississippi p 102 N83-13559

Computer management of geologic and petroleum data at the North Dakota Geological Survey [DE82-904385] p 103 N83-13694

DATA PROCESSING

A multi-site magnetotelluric measurement system with real-time data analysis [DE82-020596] p 98 N83-12704

Hydrogeochemical and stream-sediment reconnaissance basic data for Ulca quadrangle, New York. Uranium Resource Evaluation Project [DE82-020429] p 102 N83-13552

ANDROMEDA. The system for the acquisition and numerical data processing and its application for experimental device Tokamak TM-1-MH p 151 N83-16120

DATA REDUCTION

On the surface radiation budget p 22 A83-10100

DATA SYSTEMS

Computer management of geologic and petroleum data at the North Dakota Geological Survey [DE82-904385] p 103 N83-13694

DATA TRANSMISSION

Digital image transmission and coding p 127 N83-11397

DAYTIME

Solar availability in cities and towns. A computer model [PB82-202201] p 49 N83-11608

DECAY

Lifetime and effective surface recombination velocity measurements in high-efficiency Si solar cells [DE81-030361] p 74 N83-15953

DECISION MAKING

Recommendation on national radioactive waste management policies [DE81-029918] p 17 N83-13972

Energy resource recovery facility for Kent and Sussex counties, Delaware [DE82-002539] p 19 N83-14753

DECOMPOSITION

Use of oxide decompositions in advanced thermochemical hydrogen cycles for solar heat sources Experimental results on the low-temperature reactions for the tricoalt tetraoxide-cobalt monoxide pair [DE82-002390] p 77 N83-15958

DECOUPLING

Multivariable stability-margin optimisation with decoupling and output regulation p 2 A83-16191

DEEP SPACE NETWORK

Publications of the Jet Propulsion Laboratory, 1981 [NASA-CR-169519] p 170 N83-14016

DEFECTS

Grown-in defects and defects produced by 1-Me electron irradiated in AlO 3Ga0.7As P-N junction solar cells p 71 N83-15828

DEGASSING

Particulate processes in pulverized coal flames [DE82-003370] p 76 N83-14204

DEGRADATION

Environmental isolation task p 41 N83-10521 Radiation damage in front and back illuminated high resistivity silicon solar cells [NASA-TM-82965] p 48 N83-10962

Solar-cell testing and evaluation [DE82-016179] p 52 N83-12562 PV module degradation-analysis [DE82-021123] p 53 N83-12570

Electron and photon degradation of boron doped FZ silicon solar cells p 64 N83-14711

DEMAND (ECONOMICS)

Some comments on the World Energy Conference (WEC) energy demand model [USIP-82-04] p 15 N83-13628

DEMOGRAPHY

Residential End-use Energy Planning System (REEPS) [DE82-908444] p 14 N83-13819 Preliminary plan for the development of geothermal energy in the town of Hawthorne, Nevada [DE82-904440] p 14 N83-13820

Preliminary plan for the development of geothermal energy in the town of Gabbs, Nevada [DE82-904441] p 15 N83-13621

DENDRITIC CRYSTALS

Large-area sheet task advanced dendritic web growth development [NASA-CR-169624] p 58 N83-14665

Large-area sheet task advanced dendritic web growth development [NASA-CR-169639] p 59 N83-14669

Low cost solar array project cell and module formation research area Process research of non-CZ silicon material [NASA-CR-169632] p 59 N83-14671

Large-area sheet task advanced dendritic web growth development [NASA-CR-169637] p 59 N83-14675

DENMARK

Users experience in Denmark Developments, achievements and experience of the Danish activities in wind energy utilization, 1974 - 1981 p 10 N83-12536

DENSIFICATION

Performance analysis of cofining densified refuse derived fuel in a military boiler [AD-A118022] p 93 N83-11563

DENSITY DISTRIBUTION

Fusion at counterstreaming ion beams Ions Optic Fusion (IOF) p 151 N83-16124

DEOXYGENATION

Catalytic hydrodeoxygenation of coal-derived liquids and related oxygen-containing compounds p 81 N83-10132

DEPLOYMENT

Extendible and retractable masts for solar array developments p 65 N83-14725

Progress and development status of the Space Telescope solar array p 67 N83-14736

DEPOSITION

Applications of materials surface modification to prime power systems p 144 N83-15878

DESIGN ANALYSIS

End region effects upon the performance of a magnetohydrodynamic channel p 113 A83-10665

A methodology of evaluation and design of fields of focusing heliostats -- French thesis p 24 A83-11768

An experimental investigation of a stationary reflector/tracking absorber solar collector at intermediate temperatures p 27 A83-13479

Hybrid thermoelectric solar collector design and analysis p 27 A83-13482

A design method for closed loop solar energy systems with concentrating collectors p 28 A83-13583

Optimization of parabolic trough solar collectors p 29 A83-13699

Batteries and fuel cells Design, employment, chemistry -- German book p 115 A83-14041

Extremal MHD generator p 117 A83-16110

Techniques for the solution of MHD generator flows [AIAA PAPER 83-0465] p 118 A83-17928

The dynamic inducer as a cost-effective wind turbine system p 118 A83-18457

Conceptual design and cost analysis of hydraulic output unit for 15 kW free-piston Stirling engine [NASA-CR-165543] p 121 N83-10561

Automotive Stirling Engine Mod 1 Design Review, volume 2 [NASA-CR-167936] p 127 N83-10991

Operating experience with the 200 kW MOD-OA wind turbine generators p 147 N83-15916

Test status and experience with the 7.5 megawatt MOD-2 wind turbine cluster p 147 N83-15918

Conceptual design of the 6 MW MOD-5A wind turbine generator p 147 N83-15919

Conceptual design of the 7 megawatt MOD-5B wind turbine generator p 147 N83-15920

Description of the 3 MW SWT-3 wind turbine at San Geronio Pass California p 74 N83-15922

DESORPTION

A thermal desorption cold-trap unit for gaschromatographic analysis of gaseous organic pollutants [PB82-206368] p 3 N83-10152

DESULFURIZING

Desulfurization of coal by means of the Batac-jig [BMFT-FB-T-82-100] p 82 N83-10145

Fossil-energy [DE82-018269] p 86 N83-10570

A systematic investigation of the organosulfur components in coal p 86 N83-10575

Computerized simulation of the dynamic response of a coal-fired power plant with pressurized fluidized bed [BMFT-FB-T-82-094] p 90 N83-10629

Reconstruction and testing of the flue gas desulfurizing plant. Weiher 2 [BMFT-FB-T-82-108] p 91 N83-10652

Laboratory research for desulfurizing and NO-reduction by addition of ammonia under the conditions of the Bergbau-Forschung flue gas desulfurizing process [BMFT-FB-T-82-147] p 9 N83-11617

Thermodynamic data for desulfurization processes [PB82-184904] p 95 N83-12207

Mechanisms of dry SO₂ control processes [PB82-196924] p 12 N83-12668

Petrographic evaluation of pyrite in the products from two-stage coal-pyrite flotation [DE82-003593] p 105 N83-14208

DETONATION

Detonation driven induction generators with parallel and antiparallel external and induced magnetic fields p 118 A83-17371

DEUTERIUM

Wildcat. A catalyzed D-D Tokamak reactor [DE82-013712] p 125 N83-10938

Neutral-beam deposition in large, finite-beta noncircular Tokamak plasmas [DE82-008146] p 127 N83-10957

Comments on thermal runaway experiments in sub-ignition Tokamaks [IPJP-610] p 131 N83-12997

Plasma parameter measurements using neutral-particle-beam attenuation [DE82-021120] p 132 N83-13001

Advanced fuel concepts and applications [DE82-002710] p 137 N83-15110

Deuterium flux measurements in the edge plasmas of PLT and PDX during auxiliary heating experiments [DE82-001909] p 139 N83-15143

Coating of laser fusion targets by plasma polymerized organic thin films p 152 N83-16126

DEUTERIUM COMPOUNDS

Analysis of target implosion irradiated by proton beam. 1. Beam interaction with target plasma [IPJP-612] p 134 N83-13989

DEUTERIUM PLASMA

A time resolving method for determining the energy spectrum of neutrons emitted by a plasma focus device p 153 N83-16133

DEVELOPING NATIONS

Market assessment of photovoltaic power systems for agricultural applications worldwide [NASA-CR-165541] p 56 N83-13585

DIAMONDS

Growth of diamondlike films for power applications p 170 N83-15880

DICHOISM

DICHOISM

A study of silicon and GaAs solar cells, and their optical coupling by means of a dichroic mirror --- French thesis
p 23 N83-11764

DIELECTRICS

Proceedings of a Symposium on High Energy Density Capacitors and Dielectric Materials
[PB82-197344] p 160 N83-10373

DIESEL ENGINES

Sensitivities of internal combustion automotive engines to variations in fuel properties
[PB82-194961] p 84 N83-10430
NO sub x emission control for heavy duty vehicles
Toward meeting a 1986 standard
[PB82-183880] p 7 N83-10665
Performance and emissions characteristics of aqueous alcohol fuels in a DI diesel engine
[NASA-CR-167917] p 96 N83-12250
Furnigation of alcohol in a light duty automotive diesel engine
[NASA-CR-167915] p 100 N83-13272
Alcohol as a fuel for farm and construction equipment
[DE82-021022] p 100 N83-13277
Installation of a diesel engine combustion/ignition evaluation facility
[AD-A119610] p 104 N83-14189
Diesel combustion analysis using rapid sampling techniques
[AD-A119658] p 104 N83-14192
Review of DAF Indal VAWT commercialization programs
p 148 N83-15930

DIESEL FUELS

Alcohol as a fuel for farm and construction equipment
[DE82-021022] p 100 N83-13277
Characterization of diesel emissions from operation of a light-duty diesel vehicle on alternate source diesel fuels
[PB82-232448] p 101 N83-13281
Characterization of diesel emissions from operation of a light-duty diesel vehicle on alternate source diesel fuels
[PB82-234147] p 101 N83-13282
Catalytic combustion with steam injection
[NASA-TM-82923] p 111 N83-15805

DIFFERENTIAL GEOMETRY

Curvilinear coordinates for magnetic confinement geometries
[DE82-019733] p 124 N83-10928

DIFUSE RADIATION

Transmittance of reflected diffuse radiation --- for solar collectors
p 38 N83-18564

DIFFUSION

Scale effects in liquefied fuel vapor dispersion
[DE82-006198] p 11 N83-12659
Diffusion length measurements in solar cells An analysis and comparison of techniques
p 69 N83-15812
Diffused P+-N solar cells in bulk GaAs
p 69 N83-15818

DIFFUSION COEFFICIENT

Transport properties of Nafion membranes for use in three-electrode photoelectrochemical storage cells
p 160 N83-12055

DIGITAL DATA

Digital image transmission and coding
p 127 N83-11397

DIODES

Transient shutdown of an axial-groove liquid trap heat pipe thermal diode
p 157 N83-19161
Computer simulations of reflex E-beam systems and plasma stability
p 151 N83-16123
Simulation code of relativistic electron beam diodes
p 153 N83-16138

DIRECT CURRENT

A lightweight electronically commutated dc motor for electric passenger vehicles
[NASA-CR-165601] p 119 N83-10348
Losses in chopper-controlled DC series motors
[NASA-CR-167845] p 133 N83-13359
Improved SCR ac motor controller for battery powered urban electric vehicles
[NASA-CR-167919] p 169 N83-16257

DIRECT POWER GENERATORS

Stability and disturbance of large dc superconducting magnets
[DE82-012388] p 122 N83-10879
Solar cell radiation handbook
[NASA-CR-169662] p 61 N83-14687
Magnetohydrodynamic power supply systems for space applications
p 141 N83-15852
Potential role and technology status of closed-cycle MHD for light-weight nuclear space-power systems
p 142 N83-15853
MHD generator research at Stanford
p 142 N83-15854
Overview of space reactors
p 142 N83-15855

Technological boundary conditions for nuclear electric space power plants
p 142 N83-15856

DISPERSIONS

Scale effects in liquefied fuel vapor dispersion
[DE82-006198] p 11 N83-12659
The behavior of LNG vapor clouds Wind-tunnel simulation of 40 M3 LNG spill tests at China Lake Naval Weapons Center, California
[PB82-199027] p 12 N83-12665
LNG plume interaction with surface obstacles
[PB82-198995] p 12 N83-12666

DISPLACEMENT

Critical relationships for displacement processes in oil fields
[BMFT-FB-T-82-093] p 84 N83-10479

DISSIPATION

Anisotropy in MHD turbulence due to a mean magnetic field
[NASA-TM-84000] p 131 N83-12998

DISTILLATION

Tests of blending and correlation of distillate fuel properties
p 78 N83-11050
Assessment of high heat-transfer evaporators as power plant condensers to produce abundant freshwater
[PB82-198045] p 7 N83-11277
Automated probe microdistillation/mass spectrometry for the analysis of high-molecular weight compounds in fossil fuels
[PB82-022039] p 95 N83-12202

DISTRIBUTION FUNCTIONS

Study of the ionic distribution and of the energy deposition in a plasma of Tokamak heated by injection of fast neutrals
[EUR-CEA-FC-1094] p 155 N83-16226

DIURNAL VARIATIONS

Regulation of the diurnal variation of the cold productivity of an adsorption-type solar refrigeration system
p 31 N83-15135

The prediction of the thermal performance of building by the CR-method --- heat storage and transmission
[CSIR-BRR-396] p 161 N83-11578

Intermediate photovoltaic system application experiment operational performance report for CDC Light Manufacturing Building, San Bernardino, California
[DE82-020883] p 56 N83-13599

DOMESTIC ENERGY

Running hot water A systems approach to energy conservation
[FOA-C-10202-M2] p 5 N83-10628
Impact of alternate energy sources in the Greater Egypt region Franklin, Jackson, Jefferson, Perry and Williamson Counties, Illinois
[PB82-181090] p 6 N83-10642
Utilization of the waste heat of a steel work
[BMFT-FB-T-82-135] p 8 N83-11597
Once-through heat transport and seasonal storage for city of Bellingham
[DE82-001501] p 169 N83-15956

DOPED CRYSTALS

Oxygen evolution improvement at a Cr-doped SrTiO3 photoanode by a Ru-oxide coating
p 33 N83-15493
Thin film polycrystalline Si p-n junction solar cells with preferential doping
p 36 N83-17766
Low cost solar array project cell and module formation research area Process research of non-CZ silicon material
[NASA-CR-169632] p 59 N83-14671

DOPES

Effects of processing and dopant on radiation damage removal in silicon solar cells
p 63 N83-14708
Defect behavior in electron-irradiated boron- and gallium-doped silicon
p 70 N83-15823

DOPPLER EFFECT

Observations of plasma rotation in the high-beta Tokamak Torus 2
[DE82-019373] p 127 N83-10952
Apparatus for plasma electron temperature and density measurements by Thomson scattering
p 153 N83-16134

DOWNLINKING

Use of wireline logs at Cerro Prieto in identification of the distribution of hydrothermally altered zones and dike locations and their correlation with reservoir temperatures
[DE82-001981] p 107 N83-14661

DREDGED MATERIALS

The use of near color infrared photography to assess the impact of the oil and natural gas industry on Louisiana's wetlands
p 1 N83-10069

DRILLING

National Manne Pollution Program Plan Federal plan for ocean pollution research, development and monitoring Fiscal years, 1981 - 1985
[PB82-218462] p 6 N83-10656

Development of new and improvement of existing core recovery methods
[BMFT-FB-T-82-091] p 91 N83-10705

Improvement of the casing cementation of deep and ultradeep wells Part 1 Drilling muds and washing fluids
[BMFT-FB-T-82-111-PT-1] p 92 N83-11384
Contracts for field projects and supporting research on enhanced oil recovery and improved drilling technology
[DE82-002598] p 111 N83-15803

DROP SIZE

The effect of additives on the aerosolization of JP-5 jet fuel
[AD-A119324] p 106 N83-14294

DRY HEAT

Power from the hot-dry-rock geothermal resource
[DE82-000759] p 107 N83-14750

DRYING

Air circuit with heat pump --- waste heat utilization in the production of paper
[PB82-221219] p 18 N83-14312

DRYING APPARATUS

Dry processing of power plant coal rich in inerts --- use of air classifier for dry upgrading of coal with high inerts content
[BMFT-FB-T-82-101] p 90 N83-10631

DUCTS

Analysis of combustion spectra containing organ pipe tone by cepstral techniques
[NASA-TM-83034] p 77 N83-16153

DUMPING

Packaging of radioactive wastes for sea disposal
[IAEA-TECDOC-240] p 21 N83-15114

DURABILITY

Durability of solar collectors Experience from surveys of Swedish solar collector installations, 1979 - 1980
[PB82-188095] p 49 N83-11605
Primary lithium organic electrolyte battery BA-5588
[AD-A120858] p 146 N83-15900

DYES

Solar energy conversion based on the principle of fluorescent collectors
[BMFT-FB-T-82-081] p 47 N83-10621

DYNAMIC CHARACTERISTICS

Static and dynamic analysis for hinged rotor blades of 60 m span for a two bladed horizontal axis wind energy converter
p 130 N83-12535
Forced vibration analysis of rotating structures with application to vertical axis wind turbines
[DE82-000620] p 133 N83-13625

DYNAMIC LOADS

A review of aero-generator fatigue problems
p 119 N83-18939

DYNAMIC MODELS

Development, construction, and experimental operation of an improved chainless haulage system for drum-shearer loaders
[BMFT-FB-T-82-102] p 158 N83-10428
Dynamical model of an overheated magnetized plasma
p 152 N83-16131
Dynamics of ionization and transport in a magnetically confined plasma column
p 153 N83-16132
Diagnostics of nonequilibrium hydrogen plasma
p 153 N83-16135

DYNAMIC RESPONSE

Computerized simulation of the dynamic response of a coal-fired power plant with pressurized fluidized bed
[BMFT-FB-T-82-094] p 90 N83-10629
Structural-dynamic-response characteristics of Darnes vertical axis wind turbines
[DE82-003583] p 135 N83-14545

DYNAMIC STRUCTURAL ANALYSIS

Analytical prediction of the dynamic in-orbit behavior of large flexible solar arrays
p 65 N83-14723
Structural dynamic response characteristics of Darnes vertical axis wind turbines
p 148 N83-15932

DYNAMOMETERS

Automotive Stirling engine development program
[NASA-CR-167907-2] p 140 N83-15176

E

EARTH ALBEDO

Determination of the radiation budget at the Earth's surface from satellite data
p 68 N83-14808

EARTH HYDROSPHERE

Parametric study of geohydrologic performance characteristics for nuclear-waste repositories
[DE82-003145] p 17 N83-13973

EARTH ORBITS

Optimal sun-alignment techniques of large solar arrays in electric propulsion spacecraft
[AIAA PAPER 82-1898] p 25 N83-12475
Loss currents of solar cells under Low Earth Orbit (LEO) conditions
p 65 N83-14721

SUBJECT INDEX

EARTH RESOURCES

- Geothermal energy market study on the Atlantic Coastal Plain: Dover Air Force Base geothermal energy evaluation [PB82-183997] p 91 N83-10843
- Estimation of resource and reserves [PB82-230954] p 103 N83-13631
- Seismology, 1981, nuclear test ban verification Earthquake and Earth resource investigation [FOA-C-20460-T1] p 104 N83-13695
- Developing Alaska's energy resources: Actions needed to stimulate research and improve wetlands permit processing [GAO/EMD-82-44] p 18 N83-14664
- Power from the hot-dry-rock geothermal resource [DE82-000759] p 107 N83-14750
- Energy resource recovery facility for Kent and Sussex counties, Delaware [DE82-002539] p 19 N83-14753

EARTH SURFACE

- On the surface radiation budget p 22 A83-10100
- Operational considerations on the moon-day project p 38 A83-19148
- LNG plume interaction with surface obstacles [PB82-198995] p 12 N83-12666
- Determination of the radiation budget at the Earth's surface from satellite data p 68 N83-14808

ECONOMETRICS

- Comparative analysis of economic models in selected solar energy computer programs [PB82-184995] p 55 N83-12589

ECONOMIC ANALYSIS

- Developing technologies for synthetic fuels p 78 A83-10658
- Economic modeling of fault tolerant flight control systems in commercial applications p 1 A83-11156
- Airline economics — Book p 2 A83-14000
- Commercialization of parabolic dish systems p 44 N83-10540
- An economic evaluation of solar energy p 45 N83-10549
- Panel discussions Industrial support sector requirements p 4 N83-10550
- Study of photovoltaic residential retrofits. Volume 1 Executive summary p 46 N83-10605
- Evaluation of the Kioswall longwall mining system [DE82-015881] p 89 N83-10606
- Geothermal community heating for Cape Charles, Virginia [PB82-184003] p 91 N83-10640
- Impact of alternate energy sources in the Greater Egypt region: Franklin, Jackson, Jefferson, Perry and Williamson Counties, Illinois [PB82-181090] p 6 N83-10642
- Preliminary plan for the development of geothermal energy in the town of Hawthorne, Nevada [DE82-904440] p 14 N83-13620
- Preliminary plan for the development of geothermal energy in the town of Gabbs, Nevada [DE82-904441] p 15 N83-13621
- Advanced Czochralski silicon growth technology for photovoltaic modules [NASA-CR-169661] p 61 N83-14685
- Economic comparison of CAES designs employing hardrock, salt and aquifer storage reservoirs [DE82-003833] p 167 N83-14758

ECONOMIC FACTORS

- Wind power for the electric-utility industry: Policy incentives for fuel conservation — Book p 1 A83-11896
- Study of ground winds in Upper Volta: Economic and agronomic consequences for the Sudan-Sahel region of west Africa p 98 N83-12751
- Estimation of resource and reserves [PB82-230954] p 103 N83-13631

ECONOMIC IMPACT

- Geothermal resource development for direct heat applications: The impact of regulation [PB82-208414] p 8 N83-11606

ECOSYSTEMS

- Effects of acid precipitation on elemental transport from terrestrial to aquatic ecosystems [DE82-002739] p 20 N83-14778

EFFLUENTS

- Components identified in energy-related wastes and effluents [PB82-236985] p 101 N83-13283
- Modification of feed/effluent flow work exchangers for slurry service and power recovery in coal liquefaction processes [DE82-004114] p 110 N83-15499

ELASTIC BUCKLING

- Magnetoelastic instabilities and vibrations of superconducting-magnet systems [DE82-015206] p 123 N83-10880

ELASTIC PROPERTIES

- Material properties of Green River oil shale [DE82-003271] p 111 N83-15801

ELECTRIC ARCS

- Study of electrical faults in magnetohydrodynamic Faraday generators p 116 A83-16106
- Review of plasma-impurity sources during Tokamak operation [DE82-017098] p 126 N83-10951
- Equidensitometrical evaluation of a film record of an SF6 switching arc p 153 N83-16136
- Mass balance on the arc mode seed electrodes p 154 N83-16211

ELECTRIC AUTOMOBILES

- Research, development and demonstration of nickel-iron batteries for electric-vehicle propulsion [DE82-021216] p 163 N83-12582
- Annual synopsis of Argonne's aqueous battery support research, fiscal year 1981 [DE82-021143] p 163 N83-12583

ELECTRIC BATTERIES

- Batteries and fuel cells: Design, employment, chemistry — German book p 115 A83-14041
- Expected cycle life versus depth of discharge relationships of well behaved single cells and cell strings [NASA-TM-82957] p 160 N83-10558
- Production technology of an electrolyte for Na/S batteries [BMFT-FB-T-82-065] p 161 N83-10614
- Development of the sodium/sulfur batteries, phase 2 [BMFT-FB-T-82-142] p 162 N83-11599
- Technology-base research project for electrochemical storage report for 1981 [DE82-020599] p 163 N83-12573
- Thermal battery systems for ordnance fuzing [AD-A119155] p 163 N83-13590
- Lithium-sulfur dioxide (Li/SO2) battery safety hazards. Thermal studies [AD-A119381] p 163 N83-13591
- Performance criteria for photovoltaic energy systems, volume 1 [DE82-021958] p 56 N83-13596
- Performance criteria for photovoltaic energy systems, volume 2 [DE82-021683] p 56 N83-13597
- Computer-simulation code for the prediction of reliability and available capacity of modular energy-storage arrays Volume 1 Overview [DE82-906445] p 164 N83-13618
- Ambient temperature rechargeable lithium battery [AD-A119297] p 166 N83-14742
- Chemical sources: Battery p 140 N83-15844
- Primary lithium organic electrolyte battery BA-5588 [AD-A120858] p 146 N83-15900
- Studies leading to the development of high-rate lithium-sulfuryl chloride battery technology [AD-A120853] p 146 N83-15901
- Studies leading to the development of high-rate lithium-sulfuryl chloride battery technology [AD-A120002] p 146 N83-15907
- Improved SCR ac motor controller for battery powered urban electric vehicles [NASA-CR-167819] p 169 N83-16257

ELECTRIC CHARGE

- Deep discharge reconditioning and shorted storage of batteries — nickel cadmium batteries [NASA-CR-167953] p 120 N83-10502

ELECTRIC CHOPPERS

- Losses in chopper-controlled DC series motors [NASA-CR-167845] p 133 N83-13359

ELECTRIC COILS

- Inductive energy stores [AD-A118337] p 162 N83-11582

ELECTRIC CONNECTORS

- Some methods to connect a windpower induction generator to the utility network [DE82-750057] p 133 N83-13372

ELECTRIC CONTACTS

- The effect of Ta2O5 on the interaction between silicon and its contact metallization [NASA-TM-82948] p 45 N83-10554
- Solar cell having improved back surface reflector [NASA-CASE-LEW-13620-1] p 55 N83-13579
- Development of an all-metal thick film cost effective metallization system for solar cells [NASA-CR-169635] p 59 N83-14674
- Recent developments in thin silicon solar cells p 68 N83-15809

ELECTRIC CURRENT

- Loading schemes for a 50 MWth diagonally connected MHD generator p 113 A83-10659
- Determination of the integral currents of solar cells using an improved method of spectral sensitivity measurement p 23 A83-11696
- Electrical aspects of photovoltaic-system simulation [DE82-021958] p 53 N83-12568

ELECTRIC POTENTIAL

PV module degradation-analysis

- [DE82-021123] p 53 N83-12570
- Three-dimensional current distribution in coal-fired MHD channels [DE82-016958] p 99 N83-13005

ELECTRIC DISCHARGES

- Environmentally induced discharges in a solar array p 36 A83-17493
- Expected cycle life versus depth of discharge relationships of well behaved single cells and cell strings [NASA-TM-82957] p 160 N83-10558
- Electron conductivity of the active masses of lead acid batteries during discharge and permanent service [BMFT-FB-T-82-078] p 161 N83-10619
- Review of plasma-impurity sources during Tokamak operation [DE82-017098] p 126 N83-10951

ELECTRIC ENERGY STORAGE

- Development of the spherical silicon solar cell p 36 A83-17347
- Electromagnetic studies of redox systems for energy storage [NASA-CR-169593] p 165 N83-14867

ELECTRIC FIELDS

- Coupled three-dimensional flow and electrical calculations for Faraday MHD generators p 117 A83-16107
- Observations of plasma rotation in the high-beta Tokamak Torus 2 [DE82-019373] p 127 N83-10952

ELECTRIC GENERATORS

- Alternative electric generation impact simulator [PB82-180324] p 3 N83-10302
- Refrigeration system of superconducting generators for large power plants [BMFT-FB-T-82-071] p 120 N83-10369
- Garrett solar Brayton engine/generator status p 44 N83-10545
- Technical and economical assessment on Tethered Wind-Energy Systems (TWES) [DE82-017120] p 121 N83-10604
- Summary of flat-plate solar array project documentation Abstracts of published documents, 1975 to June 1982 [NASA-CR-169518] p 56 N83-13586
- Investigation of power processing technology for spacecraft applications [AD-A119644] p 135 N83-14151
- High-current pulses from inductive energy stores [DE82-004366] p 167 N83-15587
- An update of the electrofluid dynamics wind driven generators p 149 N83-15936

ELECTRIC MOTOR VEHICLES

- A lightweight electronically commutated dc motor for electric passenger vehicles [NASA-CR-165601] p 119 N83-10348
- Improved transistorized AC motor controller for battery powered urban electric passenger vehicles [NASA-CR-167978] p 120 N83-10349
- Increased automobile fuel efficiency and synthetic fuels Alternatives for reducing oil imports [OTA-E-186] p 12 N83-13270
- Losses in chopper-controlled DC series motors [NASA-CR-167845] p 133 N83-13359
- Vehicle characterization for the TAPCUT Project. Performance and cost [DE82-019772] p 13 N83-13465
- Improved SCR ac motor controller for battery powered urban electric vehicles [NASA-CR-167819] p 169 N83-16257

ELECTRIC NETWORKS

- Measurement studies of a 15 kW wind power plant — data acquisition and economic evaluation of a 15 kW windmill [BMFT-FB-T-82-109] p 122 N83-10633
- Some methods to connect a windpower induction generator to the utility network [DE82-750057] p 133 N83-13372
- Distributed photovoltaic systems. Utility interface issues and their present status Intermediate/three-phase systems — power conditioning [NASA-CR-169664] p 61 N83-14686

ELECTRIC POTENTIAL

- Fundamental research into high voltages for further development of electric power distribution systems [BMFT-FB-T-82-064] p 157 N83-10368
- Configuration selection study for isolated loads using parabolic dish modules p 45 N83-10548
- Expected cycle life versus depth of discharge relationships of well behaved single cells and cell strings [NASA-TM-82957] p 160 N83-10558
- Intermediate photovoltaic system application experiment operational performance report. Volume 7 Beverly High School, Beverly, Mass. [DE82-015790] p 46 N83-10607

ELECTRIC POWER

- Intermediate photovoltaic system application experiment operational performance Volume 6 for Lovington Square Shopping Center, Lovington, NM
[DE82-015476] p 47 N83-10608
- Instabilities driven by the parallel variation of the electrostatic potential in tandems
[DE82-018409] p 126 N83-10941
- Electrical aspects of photovoltaic-system simulation
[DE82-021956] p 53 N83-12568
- Three-dimensional current distribution in coal-fired MHD channels
[DE82-016958] p 99 N83-13005
- Thermal battery systems for ordnance fuzing
[AD-A119155] p 163 N83-13590
- Intermediate photovoltaic system application experiment operational performance report for CDC Light Manufacturing Building, San Bernardino, California
[DE82-020883] p 56 N83-13599
- Solar cell radiation handbook
[NASA-CR-169662] p 61 N83-14687
- Deep impurity trapping concepts for power semiconductor devices
p 170 N83-15877
- Lifetime and effective surface recombination velocity measurements in high-efficiency Si solar cells
[DE81-030361] p 74 N83-15953
- ### ELECTRIC POWER
- Potential benefits from a successful solar thermal program
p 3 N83-10547
- Configuration selection study for isolated loads using parabolic dish modules
p 45 N83-10548
- Power conditioning subsystem design
[AD-A117736] p 121 N83-10569
- Investigation of power processing technology for spacecraft applications
[AD-A119644] p 135 N83-14151
- ### ELECTRIC POWER PLANTS
- Approach to Nitinol power plant cost analysis
p 112 N83-10656
- Wind power for the electric-utility industry Policy incentives for fuel conservation --- Book
p 1 N83-11896
- Investigation of the equations of motion of the heliostats of a tower-type solar electric power plant
p 31 N83-15133
- Hydrogen as a vector for central receiver solar utilities
p 75 N83-16044
- Transformation of wind energy by a high-altitude power plant
p 117 N83-16112
- Methods of reducing energy consumption of the oxidant supply system for MHD/steam power plants
[AIAA PAPER 83-0468] p 118 N83-16735
- Refrigeration system of superconducting generators for large power plants
[BMFT-FB-T-82-071] p 120 N83-10369
- Water demand for generating electricity: A mathematical programming approach with application in Poland
[IIASA-RR-82-16] p 158 N83-10498
- Central-station applications System and subsystem research activities
p 40 N83-10511
- PV large systems project
p 40 N83-10512
- Sacramento Municipal Utility District 100-MW sub e photovoltaic plant
p 40 N83-10513
- Investigation of heat storage for temperature range from 200 to 500 C
[BMFT-FB-T-82-105] p 161 N83-10627
- Environmental Research Guiding Committee report
[PB82-220070] p 6 N83-10661
- Intermediate photovoltaic system application experiment operational performance report Volume 10 Newman Power Station, El Paso, Tex
[DE82-015791] p 48 N83-11588
- Analytical mode for interim expansion of electrical energy generating systems
[INPE-2558-TDL/104] p 129 N83-12520
- The 1980 survey and evaluation of utility conservation, load management, and solar end-use projects Volume 3 Utility load management project
[DE82-007247] p 10 N83-12559
- ROSET A solar-thermal electric-power simulation users guide
[DE82-021997] p 53 N83-12567
- Technology and Soviet energy availability Summary
[OTA-ISC-154] p 13 N83-13584
- Compressed-air energy storage preliminary design and site-development program in an aquifer Volume 2 Utility-system planning
[DE82-019993] p 164 N83-13611
- Electric-utility solar-energy activities 1981 survey
[DE82-905804] p 57 N83-13623
- Potential for use of peat blends with coal for electric power generation
[DE82-003634] p 110 N83-15497
- Develop and test fuel cell powered on-site integrated total energy system
[NASA-CR-168020] p 140 N83-15839

- Preliminary analysis of wave energy conversion at an offshore structure
[AD-A120079] p 146 N83-15903
- ### ELECTRIC POWER SUPPLIES
- Power conditioning unit development for MAG-TRANSIT
p 113 N83-11021
- Electric power supply of aircraft --- Russian book
p 115 N83-14115
- System analysis, design, construction and commission of a photovoltaic power plant for supply of broadcasting equipment
[BMFT-FB-T-82-125] p 68 N83-14763
- Lawrence Berkeley Laboratory neutral-beam engineering test facility power-supply system
[DE82-003044] p 137 N83-15104
- The MHD disk generator as a multimegawatt power supply operating with chemical and nuclear sources
p 141 N83-15848
- ### ELECTRIC POWER TRANSMISSION
- Fundamental research into high voltages for further development of electric power distribution systems
[BMFT-FB-T-82-064] p 157 N83-10368
- ### ELECTRIC PROPULSION
- Advances in series resonant inverter technology and its effect on spacecraft employing electric propulsion
[AIAA PAPER 82-1881] p 114 N83-12466
- ### ELECTRIC PULSES
- High-current pulses from inductive energy stores
[DE82-004366] p 167 N83-15587
- ### ELECTRICAL ENGINEERING
- Analytic tools for the electrical design of solar generators
p 66 N83-14727
- ARABSAT solar array
p 66 N83-14733
- ### ELECTRICAL FAULTS
- Study of electrical faults in magnetohydrodynamic Faraday generators
p 116 N83-16106
- ### ELECTRICAL INSULATION
- Flexible gas insulated cable for high power transmission
[BMFT-FB-T-82-099] p 158 N83-10370
- Some material implications of space nuclear reactors (non-fuel materials)
p 170 N83-15870
- Applications of a high temperature radiation resistant electrical insulation
p 144 N83-15874
- ### ELECTRICAL MEASUREMENT
- A simple parameter measurement system for solar cells
p 38 N83-18825
- Diffusion length measurements in solar cells An analysis and comparison of techniques
p 69 N83-15812
- ### ELECTRICAL PROPERTIES
- Use of test structures in the production of CdS/Cu₂S photovoltaic devices
p 32 N83-15455
- Performance criteria for photovoltaic energy systems, volume 2
[DE82-021683] p 56 N83-13597
- Microdistribution of oxygen in silicon and its effects on electronic properties
p 71 N83-15825
- ### ELECTRICAL RESISTANCE
- A new method for experimental determination of the series resistance of a solar cell
p 30 N83-14512
- Determination of optimum sunlight concentration level in space for 3-5 cascade solar cells
p 69 N83-15814
- ### ELECTRICAL RESISTIVITY
- Fully controllable heat pipe containing a short electro-osmotic pumping section
[AIAA PAPER 83-0317] p 157 N83-16647
- Electron conductivity of the active masses of lead acid batteries during discharge and permanent service
[BMFT-FB-T-82-078] p 161 N83-10619
- Radiation damage in front and back illuminated high resistivity silicon solar cells
[NASA-TM-82965] p 48 N83-10962
- ### ELECTROCATALYSTS
- Research on oxidation by air and tempering of Raney nickel electrocatalysts for the H₂ anodes of alkali combustion materials cells --- German thesis
p 119 N83-18494
- ### ELECTROCHEMICAL CELLS
- Transport properties of Nafion membranes for use in three-electrode photoelectrochemical storage cells
p 160 N83-12055
- Polycrystalline p-WSe₂ as photocathode in an electrochemical solar cell
p 29 N83-13702
- Development of the spherical silicon solar cell
p 36 N83-17347
- Pore size engineering applied to starved electrochemical cells and batteries
[NASA-TM-82893] p 119 N83-10134
- Expected cycle life versus depth of discharge relationships of well behaved single cells and cell strings
[NASA-TM-82957] p 160 N83-10558
- Electrochemical storage cell based on polycrystalline silicon
[DE82-020595] p 56 N83-13600

SUBJECT INDEX

- Computer-simulation code for the prediction of reliability and available capacity of modular energy-storage arrays Volume 1 Overview
[DE82-906445] p 164 N83-13618
- Parametric behavior of the circulating zinc-bromine battery
[DE82-001910] p 167 N83-14759
- Studies leading to the development of high-rate lithium-sulfuryl chloride battery technology
[AD-A120853] p 146 N83-15901
- ### ELECTROCHEMICAL CORROSION
- Mass balance on the arc mode seed electrodes
p 154 N83-16211
- ### ELECTROCHEMISTRY
- Sources of pressure in lithium thionyl chloride batteries
p 160 N83-12054
- Batteries and fuel cells Design, employment, chemistry --- German book
p 115 N83-14041
- Electrochemical determination of Gibbs energies of formation of cobalt and nickel sulfides
[PB82-177304] p 119 N83-10159
- Thermodynamics and photoelectrochemical behavior of the n-TiO₂ electrode in fluoride containing solutions
[AD-A119144] p 58 N83-14179
- Electromagnetic studies of redox systems for energy storage
[NASA-CR-169593] p 165 N83-14667
- ### ELECTRODEPOSITION
- Black chrome solar selective coatings optimized for high temperature applications
p 33 N83-15479
- Influence of deposition rate on the character of electrodeposited CdSe used for photoelectrochemical cells
p 34 N83-15499
- Hot-electron luminescence in aged electrodeposited CdSe liquid-junction solar cell
p 36 N83-16946
- Electrolytic deposition of low-cost, high-purity polysilicon suitable for use in solar-cell devices
[DE82-012428] p 51 N83-12552
- ### ELECTRODES
- The influence of the interface state on the properties of solar cell semiconductor electrodes
p 26 N83-13473
- Polycrystalline lanthanum rhodate and lutetium rhodate photoelectrodes for liquid junction solar cells
p 33 N83-15480
- Layered transition metal thiophosphates /MPX3/ as photoelectrodes in photoelectrochemical cells
p 33 N83-15483
- Development of a high-rate insoluble zinc electrode for alkaline batteries
[DE82-020608] p 162 N83-12572
- Thermodynamics and photoelectrochemical behavior of the n-TiO₂ electrode in fluoride containing solutions
[AD-A119144] p 58 N83-14179
- Fusion at counterstreaming ion beams Ions Optic Fusion (IOF)
p 151 N83-16124
- Crater formation by high current discharges in vacuum
p 152 N83-16129
- Mass balance on the arc mode seed electrodes
p 154 N83-16211
- ### ELECTRODYNAMICS
- An update of the electrofluid dynamics wind driven generators
p 149 N83-15936
- Numerical simulation of the interaction of an electromagnetic wave with an inhomogeneous plasma
p 154 N83-16140
- ### ELECTROHYDRODYNAMICS
- Three-dimensional fluid and electrodynamic modeling for MHD DCW channels
[AIAA PAPER 83-0464] p 117 N83-16732
- ### ELECTROLYSIS
- Operation of a steady-state pH-differential water electrolysis cell
p 75 N83-16041
- Advanced alkaline electrolysis cell development. Development of electrolysis operation cell separator for 1250C
[DE82-020697] p 76 N83-13593
- Tritium waste control October 1980 - March 1981
[DE82-002088] p 20 N83-14774
- ### ELECTROLYTES
- Sources of pressure in lithium thionyl chloride batteries
p 160 N83-12054
- Pore size engineering applied to starved electrochemical cells and batteries
[NASA-TM-82893] p 119 N83-10134
- Technology-base research project for electrochemical storage report for 1981
[DE82-020599] p 163 N83-12573
- Studies leading to the development of high-rate lithium sulfuryl chloride battery technology
[AD-A120002] p 146 N83-15907
- ### ELECTROLYTIC CELLS
- Operation of a steady-state pH-differential water electrolysis cell
p 75 N83-16041
- High efficiency lithium-thionyl chloride cell
[AD-A118696] p 131 N83-12537

SUBJECT INDEX

Lithium-sulfur dioxide (Li/SO₂) battery safety hazards. Thermal studies [AD-A119381] p 163 N83-13591

Advanced alkaline electrolysis cell development. Development of electrolysis operation cell separator for 1250C [DE82-020697] p 76 N83-13593

Primary lithium organic electrolyte battery BA-5588 [AD-A120858] p 146 N83-15900

ELECTROMAGNETIC ABSORPTION

Optical absorption coefficient and minority carrier diffusion length measurements in low-cost silicon solar cell material p 30 A83-13922

The 30-MJ superconducting magnetic energy storage for BPA transmission-line stabilizer [DE82-002355] p 165 N83-14414

ELECTROMAGNETIC INTERFERENCE

Television interference and acoustic emissions associated with the operation of the Darnes VAWT p 149 N83-15934

ELECTROMAGNETIC RADIATION

Interaction of electromagnetic radiation and microstructural materials with regard to the production of spectral-selective solar absorbers — German thesis p 37 A83-18497

The Doublet III Thomson-scattering-system hemiconcentric triplet lens [DE82-017384] p 123 N83-10908

Numerical simulation of the interaction of an electromagnetic wave with an inhomogeneous plasma p 154 N83-16140

ELECTROMECHANICAL DEVICES

On the optimization of magnetic field sources in electromechanical energy conversion p 112 A83-10641

ELECTROMOTIVE FORCES

Theory of open circuit photo-voltage in degenerate abrupt p-n junctions p 36 A83-17767

ELECTRON ACCELERATION

Particle-beam fusion [DE82-003107] p 138 N83-15118

ELECTRON ACCELERATORS

Study of ion beam-initiated inertial-confinement fusion [DE82-013935] p 124 N83-10931

Pulsed power for inertial-confinement fusion [DE82-001991] p 137 N83-15116

ELECTRON BEAMS

Study of ion beam-initiated inertial-confinement fusion [DE82-013935] p 124 N83-10931

Computer simulations of reflex E-beam systems and plasma stability p 151 N83-16123

Simulation code of relativistic electron beam diodes p 153 N83-16138

ELECTRON CYCLOTRON HEATING

Lower hybrid RF current drive and electron-cyclotron heating on the Versator 2 Tokamak [DE82-017127] p 125 N83-10934

Observation of the parametric decay instability during electron cyclotron resonance heating on the Versator 2 Tokamak [DE82-012573] p 125 N83-10939

Second-cyclotron-harmonic emission measurements on ISX-B [DE82-009938] p 126 N83-10949

ELECTRON DENSITY (CONCENTRATION)

Faraday-rotation measurements in ISX-B [DE82-011507] p 127 N83-10953

Diagnostics of nonequilibrium hydrogen plasma p 153 N83-16135

ELECTRON DISTRIBUTION

Effect of radiation and non-Maxwellian electron distribution on relaxation processes in an atmospheric cesium seeded argon plasma [EUT-82-E-124] p 140 N83-15144

ELECTRON EMISSION

Emission characteristics of refractory materials — as electrodes in aerodynamic generators p 116 A83-16019

ELECTRON ENERGY

Second-cyclotron-harmonic emission measurements on ISX-B [DE82-009938] p 126 N83-10949

Diagnostics of nonequilibrium hydrogen plasma p 153 N83-16135

ELECTRON IMPACT

Electron impact ionization of highly charged molybdenum impurities in Tokamak plasmas p 151 N83-16119

ELECTRON IRRADIATION

Electron and photon degradation of boron doped FZ silicon solar cells p 64 N83-14711

ELECTRON MICROSCOPY

Microstructure of coal p 87 N83-10576

ELECTRON PHOTON CASCADES

Determination of optimum sunlight concentration level in space for 3-5 cascade solar cells p 66 N83-14732

ENERGY CONSUMPTION

ELECTRON RECOMBINATION

Exactly soluble model for a solar cell with nonlinear recombination p 24 A83-11811

ELECTRON SCATTERING

Helium population model p 154 N83-16139

ELECTRON SOURCES

Study of ion beam-initiated inertial-confinement fusion [DE82-013935] p 124 N83-10931

ELECTRON TRANSFER

Projected temperature dependence of quantum yields for photoreactions involving energy or electron transfer p 37 A83-18559

ELECTRON TRANSITIONS

Helium population model p 154 N83-16139

ELECTRON TUNNELING

Transport mechanisms for Mg/Zn3P2 junctions p 35 A83-16071

Field ionization of deep levels in semiconductors with applications to Hg/1-x/Cd/x/ Te p-n junctions p 156 A83-16089

ELECTRONIC CONTROL

Design of electronic optimizer for solar electric drive system p 36 A83-17150

Transient shutdown of an axial-groove liquid trap heat pipe thermal diode p 157 A83-19161

Deep impurity trapping concepts for power semiconductor devices p 170 N83-15877

ELECTRONIC EQUIPMENT

Protection of large capacitor banks [DE82-017353] p 120 N83-10366

ELECTRONIC MODULES

Power conditioning unit development for MAG-TRANSIT p 113 A83-11021

ELECTRONOGRAPHY

The residual voltage in fast electrophotography of a-SiH_x/x p 34 A83-15511

ELECTROPHORESIS

Electrophoretic CdS/Cu₂S solar cells for space applications p 63 N83-14704

ELECTROSTATIC BONDING

Photovoltaic module encapsulation design and materials selection, volume 1, abridged [NASA-CR-169372] p 45 N83-10553

ELECTROSTATIC PRECIPITATORS

Pilot-scale assessment of conventional particulate control technology for pressurized fluidized-bed combustion emissions p 103 N83-13673

Improvement of electrostatic precipitators performance through conditioning by flue gas [BMFT-FB-T-82-123] p 20 N83-14783

ELECTROSTATIC SHIELDING

Anti-static coat for solar arrays p 67 N83-14738

ELECTROSTATICS

Instabilities driven by the parallel variation of the electrostatic potential in tandem [DE82-018409] p 126 N83-10941

EMERGENCIES

Alternative means of coping with national energy emergencies [DE82-002812] p 21 N83-15955

EMISSION

NO sub x emission control for heavy duty vehicles Toward meeting a 1986 standard [PB82-183880] p 7 N83-10665

Plasma parameter measurements using neutral-particle-beam attenuation [DE82-021120] p 132 N83-13001

Boiler efficiency and emissions testing using Refuse-Derived Fuel (RDF) and coal [AD-A119291] p 19 N83-14772

ENCAPSULATING

Photovoltaic module encapsulation design and materials selection, volume 1, abridged [NASA-CR-169372] p 45 N83-10553

Investigation of test methods, material properties and processes for solar cell encapsulants [NASA-CR-169636] p 60 N83-14676

Progress in developing high performance solar blankets and arrays p 71 N83-15829

A preliminary evaluation of a potential space worth encapsulant p 72 N83-15832

ENERGY ABSORPTION

Optical analysis of solar energy tubular absorbers p 25 A83-12596

The 30-MJ superconducting magnetic energy storage for BPA transmission-line stabilizer [DE82-002355] p 165 N83-14414

ENERGY ABSORPTION FILMS

Thermal and optical analysis of an evacuated circular cylindrical concentrating collector p 29 A83-13697

Black chrome solar selective coatings optimized for high temperature applications p 33 A83-15479

Stability of SnO₂ thin films used for photovoltaic devices p 38 A83-18563

Outlook for space energy systems at the end of the three-year assessment p 18 N83-14734

ENERGY BUDGETS

On the surface radiation budget p 22 A83-10100

ENERGY CONSERVATION

Estimation of aircraft fuel consumption p 1 A83-10186

Economic modeling of fault tolerant flight control systems in commercial applications p 1 A83-11156

Thermal infrared sensing applied to energy conservation in building envelopes /Thermosense IV/, Proceedings of the Meeting, Ottawa, Ontario, Canada, September 1-4, 1981 p 2 A83-12686

The application of energy saving concepts to future fighter/attack aircraft design [AIAA PAPER 83-0092] p 2 A83-16516

Advances in energy technology; Proceedings of the Eighth Annual UMR-DNR Conference on Energy, University of Missouri-Rolla, Rolla, MO, November 4-7, 1981 p 169 A83-17115

The solar assisted air-source heat pump system, part 1 [PB82-218439] p 39 N83-10286

Economic efficiency in the sizing of residential heat pumps [PB82-179029] p 3 N83-10401

Potential benefits from a successful solar thermal program p 3 N83-10547

ANFLOW Characterization and development of an energy conserving wastewater treatment system p 4 N83-10585

Proceedings of the conference on energy conservation Retrofit of Municipal Wastewater Treatment Facilities [DE82-013710] p 5 N83-10612

Study of the possibilities of more rational use of energy in the sector of trade and commerce, part 1 [BMFT-FB-T-82-076-PT-1] p 5 N83-10618

Running hot water A systems approach to energy conservation [FOA-C-10202-M2] p 5 N83-10628

Study of the possibilities of more rational use of energy in the sector of trade and commerce, part 2 [BMFT-FB-T-82-077-PT-2] p 7 N83-1591

Diesel driven low capacity heat pump for heating and hot water production [BMFT-FB-T-82-128] p 7 N83-11592

Economical optimized thermal insulation in buildings [BMFT-FB-T-82-131] p 8 N83-11594

Energy conservation strategy for the 1980's [GPO-86-217] p 10 N83-12521

The 1980 survey and evaluation of utility conservation, load management, and solar end-use projects Volume 3 Utility load management project [DE82-007247] p 10 N83-12559

Secretary's report to Congress Secretary's statement, program review and outlook [DE82-021878] p 10 N83-12581

Industrial energy use, volume 2 [PB82-200593] p 11 N83-12593

Increased automobile fuel efficiency and synthetic fuels Alternatives for reducing oil imports [OTA-E-186] p 12 N83-13270

Vehicle characterization for the TAPCUT Project Performance and cost [DE82-019772] p 13 N83-13465

Evaluation of estimated energy conservation measure costs and benefits in the residential multifamily sector [DE82-000490] p 14 N83-13606

Residential End-use Energy Planning System (REEPS) [DE82-906444] p 14 N83-13619

An assessment of the industrial energy conservation program, volume 2 [PB82-225780] p 15 N83-13630

Air circuit with heat pump — waste heat utilization in the production of paper [PB82-221219] p 18 N83-14312

Controlling energy consumption in single buildings [AD-A118898] p 19 N83-14739

Modification of feed/effluent flow work exchangers for slurry service and power recovery in coal liquefaction processes [DE82-004114] p 110 N83-15499

Overview of passive solar design techniques [AD-A119993] p 73 N83-15899

ENERGY CONSUMPTION

Methods of reducing energy consumption of the oxidant supply system for MHD/steam power plants [AIAA PAPER 83-0468] p 118 A83-16735

Energy for agriculture in Pakistan [IASA-RR-82-20] p 3 N83-10499

Potential benefits from a successful solar thermal program p 3 N83-10547

NECAP 4.1 NASA's Energy Cost Analysis Program thermal response factor routine [NASA-CR-165982] p 4 N83-10562

ENERGY CONVERSION

- NECAP 4 1 NASA's Energy-Cost Analysis Program fast input manual and example [NASA-TM-83241] p 4 N83-10566
- Economical optimized thermal insulation in buildings [BMFT-FB-T-82-131] p 8 N83-11594
- Earth-covered buildings An exploratory analysis for hazard and energy performance [PB82-189564] p 10 N83-12285
- Wood Road School, Ballston Spa, New York solar-energy-system performance evaluation, November 1981 - April 1982 [DE82-021301] p 54 N83-12586
- Industrial energy use, annual report for 1979 - 1980 [PB82-200585] p 11 N83-12590
- A review of the Energy Productivity Center's least cost energy strategy study [PB82-188111] p 11 N83-12591
- Industrial energy use, volume 2 [PB82-200593] p 11 N83-12593
- Methods of reducing energy consumption of the oxidant supply system for MHD/steam power plants [NASA-TM-83025] p 133 N83-13589
- Computerized instrumented residential audit, version 10 Source listings [DE82-019953] p 14 N83-13613
- Residential End-use Energy Planning System (REEPS) [DE82-906444] p 14 N83-13619
- Preliminary plan for the development of geothermal energy in the town of Hawthorne, Nevada [DE82-904440] p 14 N83-13620
- Some comments on the World Energy Conference (WEC) energy demand model [USIP-82-04] p 15 N83-13628
- Technical and economic assessment of processes for the production of butanol and acetone [NASA-CR-169623] p 106 N83-14293
- Controlling energy consumption in single buildings [AD-A118898] p 19 N83-14739
- Agricultural application of SWECS p 111 N83-15923
- Value of the energy data base [DE82-014250] p 22 N83-16256
- ### ENERGY CONVERSION
- The feasibility of refuse-fired energy generation in Philadelphia, Pennsylvania p 88 N83-10587
- Urban waste as a potential source for brick plants p 88 N83-10591
- Conversion of municipal solid waste to energy, Jacksonville, Florida p 5 N83-10593
- Technical and economical assessment on Tethered Wind-Energy Systems (TWES) [DE82-017120] p 121 N83-10604
- Biomass fuels update TVAs biomass fuels program [DE82-904990] p 89 N83-10613
- Geothermal energy market study on the Atlantic Coastal Plain Dover Air Force Base geothermal energy evaluation [PB82-183997] p 91 N83-10643
- Summary outline of DOE geoscience and geoscience related research [DE82-008203] p 97 N83-12480
- Cell module and fuel conditioner development [NASA-CR-165462-A] p 130 N83-12524
- Wind Energy Conversion Devices [VKI-LS-1981-8] p 130 N83-12526
- General introduction to wind energy conversion [NLR-MP-81014-U] p 130 N83-12527
- Site characteristics for wind energy conversion devices p 130 N83-12528
- Horizontal and vertical axis wind turbines p 130 N83-12529
- Users experience in Denmark Developments, achievements and experience of the Danish activities in wind energy utilization, 1974 - 1981 p 10 N83-12536
- Second program on energy research and technologies [NASA-TM-77154] p 13 N83-13587
- Total energy food plant 21 million gallon ethanol facility [DE82-019258] p 14 N83-13617
- Use of wireline logs at Cerro Prieto in identification of the distribution of hydrothermally altered zones and dike locations and their correlation with reservoir temperatures [DE82-001981] p 107 N83-14661
- Operating and maintenance experience with a 6-kW wind energy conversion system at Naval Station, Treasure Island, California [AD-A119389] p 136 N83-14740
- Fuel and electricity generation from illumination of organic interfaces [AD-A119305] p 67 N83-14741
- Advanced fuel concepts and applications [DE82-002710] p 137 N83-15110
- Proceedings of the AFOSR Special Conference on Pnme-Power for High Energy Space Systems, volume 2 [AD-A118888] p 143 N83-15860

- Status of thermoelectronic laser energy conversion, TELEC p 143 N83-15864
- The phototron A light to RF energy conversion device p 143 N83-15866
- Preliminary analysis of wave energy conversion at an offshore structure [AD-A120079] p 146 N83-15903
- Economics of DAWT wind energy systems p 150 N83-15939
- Value of the energy data base [DE82-014250] p 22 N83-16256
- ### ENERGY CONVERSION EFFICIENCY
- On the optimization of magnetic field sources in electromechanical energy conversion p 112 N83-10641
- Performance of the Wells turbine at starting p 113 N83-10661
- On the formula for the upper limit of photovoltaic solar energy conversion efficiency p 23 N83-10699
- A study of silicon and GaAs solar cells, and their optical coupling by means of a dichroic mirror — French thesis p 23 N83-11764
- Reflections on solar collectors at elevated temperatures /260-1000 C/ — French thesis p 23 N83-11766
- Determination of the interference between the elements of a central-receiver solar system p 24 N83-11848
- Research on the characteristic parameters of thermophotovoltaic /TPV/ converter performance p 24 N83-12029
- Advances in series resonant inverter technology and its effect on spacecraft employing electric propulsion [AIAA PAPER 82-1881] p 114 N83-12466
- Thermal storage performance calculations by closed form and finite difference solutions [ASME PAPER 82-HT-52] p 26 N83-12799
- The influence of the interface state on the properties of solar cell semiconductor electrodes p 26 N83-13473
- Transient performance of evacuated tubular solar collectors p 27 N83-13478
- An experimental investigation of a stationary reflector/tracking absorber solar collector at intermediate temperatures p 27 N83-13479
- Incident angle modifiers for flat-plate solar collectors - Analysis of measurement and calculation procedures p 27 N83-13480
- Analysis of two-phase flow solar collectors with application to heat pumps p 27 N83-13481
- Luminescent solar concentrators - A review p 28 N83-13581
- Collection of solar energy at specified output temperature p 28 N83-13582
- Thermal and optical analysis of an evacuated circular cylindrical concentrating collector p 29 N83-13697
- Optimization of parabolic trough solar collectors p 29 N83-13699
- A method of rating solar collectors p 29 N83-13701
- Planar multijunction high voltage solar cell chip p 30 N83-13923
- A p-n heterojunction model for the thin-film CuInSe₂/CdS solar cell p 30 N83-14513
- Effect of off-south orientation on the performance of collector reflector system in India p 30 N83-14671
- Testing of the energy module of a parabolocylindrical solar installation p 31 N83-15130
- Role of impurities in silicon solar cell performance p 32 N83-15457
- Spectroradiometer measurements in support of photovoltaic device testing p 32 N83-15458
- Characteristics of a Savonius windmill power system with a synchronous generator p 115 N83-15797
- Hydrogenated a-Si/x/Ge/1-x/ - A potential solar cell material p 34 N83-15871
- Operation of a steady-state pH-differential water electrolysis cell p 75 N83-16041
- Hydrogen as a vector for central receiver solar utilities p 75 N83-16044
- Evaluation of thermophotovoltaic conversion efficiency p 35 N83-16086
- Inflow disk generator for open-cycle MHD power generation p 116 N83-16104
- The STD/MHD codes - Comparison of analyses with experiments — MHD generator performance prediction and tests p 116 N83-16105
- The properties and production of solar cells p 35 N83-16183
- Performance results of a 300 MWth generator at high magnetic field [AIAA PAPER 83-0394] p 117 N83-16690
- Design of a 13% efficient n-GaAs/1-x/P/x/ semiconductor-liquid junction solar cell p 36 N83-17801
- A parametric analysis of the performances of a linear collectors' network of a solar power plant p 36 N83-18139

- Axysymmetric reflectors of the stepped spherical type p 38 N83-19194
- Photovoltaic properties of cadmium sulfide/trivalent-metal phthalocyanine heterojunction devices p 39 N83-19259
- Central-station applications System and subsystem research activities p 40 N83-10511
- Research possibilities? No! Needs for research to make PV solar energy utilization broadly competitive p 40 N83-10517
- Evaluation of advanced R and D topics in photovoltaics p 41 N83-10518
- Test program for wind energy conversion system GROWIAN [BMFT-FB-T-82-072] p 128 N83-11590
- Solar-energy-system performance evaluation, Cathedral Square, Burlington, Vermont, July - December 1981 [DE82-016999] p 52 N83-12563
- Increased automobile fuel efficiency and synthetic fuels Alternatives for reducing oil imports [OTA-E-186] p 12 N83-13270
- Analysis of defect structure in silicon Characterization of samples from UCP ingot 5848-13C [NASA-CR-169617] p 60 N83-14680
- NASA-CAST program in photovoltaic energy conversion p 68 N83-15807
- New silicon cell design concepts for 20 percent AMI efficiency p 68 N83-15808
- Air Force development of thin GaAs solar cells p 69 N83-15816
- GaAs solar cells for concentrator systems in space p 70 N83-15820
- ### ENERGY DISSIPATION
- An experimental investigation of convective losses from solar receivers [UILU-ENG-81-4003] p 39 N83-10500
- Production and experimental study of the dissipative trapped ion instability p 123 N83-10910
- ### ENERGY DISTRIBUTION
- Measurements of energy distribution and thrust for microwave plasma coupling of electrical energy to hydrogen for propulsion [AIAA PAPER 82-1951] p 75 N83-12508
- ### ENERGY GAPS (SOLID STATE)
- Direct-gap group IV semiconductors based on tin p 22 N83-10294
- Meaning of the photovoltaic band gap for amorphous semiconductors p 25 N83-12287
- ### ENERGY METHODS
- Second program on energy research and technologies [NASA-TM-77154] p 13 N83-13587
- ### ENERGY POLICY
- Current topics of SPS realization from a European viewpoint p 156 N83-11283
- Wind power for the electric-utility industry Policy incentives for fuel conservation — Book p 1 N83-11896
- Panel discussions Industrial support sector requirements p 4 N83-10550
- Solar thermal technologies benefits assessment Objectives, methodologies and results for 1981 [NASA-CR-169373] p 4 N83-10551
- Study of the possibilities of more rational use of energy in the sector of trade and commerce, part 1 [BMFT-FB-T-82-076-PT-1] p 5 N83-10618
- Development of large scale production methods for components of solar energy collection Transparent glass covers and their connection to the collector system [BMFT-FB-T-82-083] p 47 N83-10622
- Technical study on the possibilities of oil shale combustion in a fluidized bed furnace including cost estimates for a plant to be built [BMFT-FB-T-82-085] p 90 N83-10623
- Tests with concentrating collectors — construction, evaluation and qualification of parabolic solar absorbers [BMFT-FB-T-82-104] p 47 N83-10626
- Running hot water A systems approach to energy conservation [FOA-C-10202-M2] p 5 N83-10628
- Study of the possibilities of more rational use of energy in the sector of trade and commerce, part 2 [BMFT-FB-T-82-077-PT-2] p 7 N83-11591
- Utilization of the waste heat of a steel work [BMFT-FB-T-82-135] p 8 N83-11597
- Prototype solar house Study of the scientific evaluation and feasibility of a research and development project [BMFT-FB-T-82-137] p 49 N83-11598
- Energy conservation strategy for the 1980's [GPO-86-217] p 10 N83-12521
- Secretary's report to Congress Secretary's statement, program review and outlook [DE82-021878] p 10 N83-12581
- A review of the Energy Productivity Center's least cost energy strategy study [PB82-188111] p 11 N83-12591

SUBJECT INDEX

SUBJECT INDEX

- Basic engineering of a 10 t/hr prototype plant for the Vereinigte Elektrizitätswerke Westfalen (VEW) coal conversion process [BMFT-FB-T-82-114] p 101 N83-13378
- Some comments on the World Energy Conference (WEC) energy demand model [USIP-82-04] p 15 N83-13628
- SFW-Funk process for gasification of solid urban and industrial waste [BMFT-FB-T-82-117] p 16 N83-13651
- Measuring program for the R and D project on gasification of domestic and industrial wastes [BMFT-FB-T-82-118] p 16 N83-13652
- Developing Alaska's energy resources. Actions needed to stimulate research and improve wetlands permit processing [GAO/EMD-82-44] p 18 N83-14664
- Outlook for space energy systems at the end of the three-year assessment p 18 N83-14734
- Energy resource recovery facility for Kent and Sussex counties, Delaware [DE82-002539] p 19 N83-14753
- System analysis, design, construction and commission of a photovoltaic power plant for supply of broadcasting equipment [BMFT-FB-T-82-125] p 68 N83-14763
- Flat plate solar collectors [BMFT-FB-T-82-139] p 68 N83-14764
- Regional energy planning. Some suggestions to public administration [CISE-1795] p 19 N83-14765
- Improvement of electrostatic precipitators performance through conditioning by flue gas [BMFT-FB-T-82-123] p 20 N83-14783
- Determination of the radiation budget at the Earth's surface from satellite data p 68 N83-14808
- Energy policy formulation in South Africa. APL as a tool to identify options p 20 N83-14968
- Ideas for implementing air-quality studies in the western Rocky Mountain region [DE82-000663] p 22 N83-15960
- Value of the energy data base [DE82-014250] p 22 N83-16256

ENERGY REQUIREMENTS

- Attempt to determine the power demand of a helicopter control system on the basis of flight tests p 1 A83-10439
- Study of the possibilities of more rational use of energy in the sector of trade and commerce, part 1 [BMFT-FB-T-82-076-PT-1] p 5 N83-10618
- Assessment of high heat-transfer evaporators as power plant condensers to produce abundant freshwater [PB82-198045] p 7 N83-11277
- Earth-covered buildings. An exploratory analysis for hazard and energy performance [PB82-189564] p 10 N83-12285
- Some comments on the World Energy Conference (WEC) energy demand model [USIP-82-04] p 15 N83-13628
- Power requirements for manned space stations p 140 N83-15842
- Chemical sources. Battery p 140 N83-15844
- Alternative means of coping with national energy emergencies [DE82-002812] p 21 N83-15955

ENERGY SOURCES

- Primary energy. Present status and future perspectives — Book p 79 A83-14120
- Results of testing a development module of the second-generation E-systems concentrating photovoltaic-thermal module [DE82-015671] p 46 N83-10598
- Energy resource recovery facility for Kent and Sussex counties, Delaware [DE82-002539] p 19 N83-14753
- Physics (selected articles) [AD-A118830] p 154 N83-16143

ENERGY SPECTRA

- Observation of the parametric decay instability during electron cyclotron resonance heating on the Versator 2 Tokamak [DE82-012573] p 125 N83-10939
- ORNL integral experiment to provide data for evaluating magnetic-fusion-energy shielding concepts. Part 1. Attenuation measurements [DE82-019775] p 135 N83-13999
- Dynamical model of an overheated magnetized plasma p 152 N83-16131
- A time resolving method for determining the energy spectrum of neutrons emitted by a plasma focus device p 153 N83-16133

ENERGY STORAGE

- Metallurgy of rechargeable hydrides p 160 A83-11509
- Particle size distribution of Ni microprecipitates in LaNi₅ used for hydrogen storage p 75 A83-12295

- International Conference on Energy Storage, Brighton, Sussex, England, April 29-May 1, 1981, Proceedings p 160 A83-14045

- The effect of crystal size on the thermal energy storage capacity of thickened Glauber's salt p 160 A83-18562
- Inductive energy stores [AD-A118337] p 162 N83-11582

- Development of enhanced heat transfer/transport/storage slurries for thermal-system improvement [DE82-021238] p 158 N83-12387
- Preliminary design study of compressed-air energy storage in a salt dome. Volume 4. CAES turbomachinery design [DE82-019781] p 162 N83-12561

- Telluride School, Telluride, Colorado solar-energy-system performance evaluation, February 1982 - April 1982 p 54 N83-12585
- Summary of DOE Hydrogen Program FY-1981 by the Hydrogen Energy Coordinating Committee [DE82-020494] p 76 N83-13276

- Second program on energy research and technologies [NASA-TM-77154] p 13 N83-13587
- Performance criteria for photovoltaic energy systems, volume 1 [DE82-021958] p 56 N83-13596

- Preliminary design study of underground pumped hydro and compressed-air energy storage in hard rock. Volume 8. Design approaches - UPH Appendix B. Shafts [DE81-028202] p 164 N83-13607
- Compressed-air energy storage preliminary design and site-development program in an aquifer. Volume 1. Executive summary [DE82-019284] p 164 N83-13610

- Compressed-air energy storage preliminary design and site-development program in an aquifer. Volume 2. Utility-system planning [DE82-019993] p 164 N83-13611
- Development of zinc bromide batteries for stationary energy storage [DE82-019283] p 164 N83-13612

- Computer-simulation code for the prediction of reliability and available capacity of modular energy-storage arrays. Volume 1. Overview [DE82-006445] p 164 N83-13618
- Photovoltaic balance-of-system assessment [DE82-006429] p 57 N83-13622

- Stationary flywheel energy storage systems [PB82-238130] p 165 N83-13637
- The 30-MJ superconducting magnetic energy storage for BPA transmission-line stabilizer [DE82-002355] p 165 N83-14414

- Design of plywood and paper flywheel rotors p 165 N83-14662
- The NASA Redox Storage System Development project, 1980 [NASA-TM-82940] p 166 N83-14683

- Assessment of alternative power sources for mobile mining machinery [NASA-TM-82695] p 136 N83-14691
- Industrial thermal energy storage. What are the possibilities? [DE82-001494] p 166 N83-14748

- Design and testing of a 13.75 MW converter for a superconducting magnetic-energy-storage system [DE82-002385] p 166 N83-14749
- Aquifer stability investigation [DE82-003831] p 166 N83-14754

- Advanced concepts. The second generation of compressed air-energy storage technology [DE82-003838] p 167 N83-14755
- Environmental and regulatory aspects of compressed-air energy storage [DE82-003868] p 19 N83-14757

- Economic comparison of CAES designs employing hardrock, salt and aquifer storage reservoirs [DE82-003833] p 167 N83-14758
- Research and technology, Lewis Research Center [NASA-TM-83038] p 167 N83-15169

- High-current pulses from inductive energy stores [DE82-004366] p 167 N83-15587
- Alkaline fuel cells for prime power and energy storage p 167 N83-15845

ENERGY TECHNOLOGY

- Developing technologies for synthetic fuels p 78 A83-10658
- Status of new thin-film photovoltaic technologies p 23 A83-11510
- Solar thermal electricity generation - EURELIOS, the 1 MW/el/ heliostatic power plant of the European communities p 24 A83-11802
- Mathematical model for a noniterative optimization of each system for exploiting solar energy p 24 A83-11849

- The rebirth of the Rankine cycle - Energy production on the basis of low- and medium-temperature heat sources p 113 A83-18688

- Performance characteristics of 350 kW photovoltaic power system for Saudi Arabian villages p 28 A83-13647
- A review of UK wind energy activities p 114 A83-13650

- International Conference on Energy Storage, Brighton, Sussex, England, April 29-May 1, 1981, Proceedings p 160 A83-14045
- Primary energy. Present status and future perspectives — Book p 79 A83-14120

- Regulation of the diurnal variation of the cold productivity of an adsorption-type solar refrigeration system p 31 A83-15135
- Concerning the improvement of solar heating and cooling systems p 31 A83-15136

- Recent advances in amorphous silicon solar cells p 34 A83-15510
- Photovoltaic prospects in Europe p 35 A83-16184

- Advances in energy technology; Proceedings of the Eighth Annual UMR-DNR Conference on Energy, University of Missouri-Rolla, Rolla, MO, November 4-7, 1981 p 169 A83-17115
- Biomass energy p 81 A83-18560

- Alternative electric generation impact simulator [PB82-180324] p 3 N83-10302
- Experiments on the ADAM 1 plant for the optimization of methanization process in the long distance nuclear energy transmission system test run performed in the spring of 1980 [BLL-T5869/BG/MRS14614/82] p 85 N83-10495

- Flat Plate Solar Array Project. Proceedings of the 20th Project Integration Meeting [NASA-CR-169370] p 39 N83-10505
- National photovoltaic program p 3 N83-10506

- PV history. Lessons for the future p 40 N83-10514
- Potential benefits from a successful solar thermal program p 3 N83-10547

- Power conditioning subsystem design [AD-A117736] p 121 N83-10569
- Water hyacinth wastewater treatment system p 88 N83-10586

- Energy recovery and cogeneration from an existing municipal incinerator p 5 N83-10589
- Impact of alternate energy sources in the Greater Egypt region. Franklin, Jackson, Jefferson, Perry and Williamson Counties, Illinois [PB82-181090] p 6 N83-10642

- Modular small hydro configuration [PB82-184953] p 129 N83-12327
- Summary outline of DOE geoscience and geoscience related research [DE82-008203] p 97 N83-12480

- Components identified in energy-related wastes and effluents [PB82-236985] p 101 N83-13283
- Biomedical and environmental sciences programs at the Oak Ridge National Laboratory [DE82-018897] p 13 N83-13516

- Solar thermal technology report, FY 1981. Volume 1. Executive summary [NASA-CR-169526] p 55 N83-13581
- Solar thermal technology report, FY 1981. Volume 2. Technical [NASA-CR-169527] p 55 N83-13582

- Second program on energy research and technologies [NASA-TM-77154] p 13 N83-13587
- Performance criteria for photovoltaic energy systems, volume 1 [DE82-021958] p 56 N83-13596

- An assessment of gas-side fouling in cement plants [NASA-CR-169513] p 15 N83-13644
- A reference-maternal system for estimating health and environmental risks of selected maternal cycles and energy systems [DE82-019309] p 15 N83-13647

- Lift off. A very fine front metallization geometry technique for high efficiency solar cells p 62 N83-14701
- Retrospect of solar cell development in West Germany p 64 N83-14712

- Small-scale energy-technology projects in the Pacific Territories. A case-study review [DE82-001338] p 67 N83-14751
- Research and technology, Lewis Research Center [NASA-TM-83038] p 167 N83-15169

- Energy efficient face seal [NASA-CR-165591] p 21 N83-15659
- Physics (selected articles) [AD-A118830] p 154 N83-16143

ENERGY TRANSFER

- Measurements of energy distribution and thrust for microwave plasma coupling of electrical energy to hydrogen for propulsion [AIAA PAPER 82-1951] p 75 A83-12508

- Transport of solar energy with optical fibres p 29 A83-13698
- Projected temperature dependence of quantum yields for photoreactions involving energy or electron transfer p 37 A83-18559
- Neutral-beam deposition in large, finite-beta noncircular Tokamak plasmas [DE82-008146] p 127 N83-10957
- A computer simulation model of salt-gradient solar ponds p 55 N83-13580
- Solar energy conversion using surface plasmons for broadband energy transport p 69 N83-15815
- Survey of utility load management projects Thrd revised report [DE82-000888] p 169 N83-15957
- Dynamical model of an overheated magnetized plasma p 152 N83-16131
- ENGINE CONTROL**
- Automotive Stirling Engine Mod 1 Design Review, volume 2 [NASA-CR-167936] p 127 N83-10991
- ENGINE COOLANTS**
- Radiant heating tests of several liquid metal heat-pipe sandwich panels [AIAA PAPER 83-0319] p 157 A83-16649
- ENGINE DESIGN**
- The theory of aircraft engines --- Russian book p 113 A83-10675
- Radiant heating tests of several liquid metal heat-pipe sandwich panels [AIAA PAPER 83-0319] p 157 A83-16649
- Design of a low emission combustor for an automotive gas turbine [AIAA PAPER 83-0338] p 117 A83-16664
- A conceptual study of the potential for automotive-derived and free-piston Stirling engines in 30- to 400-kilowatt stationary power applications [NASA-CR-165274] p 121 N83-10568
- The fuel efficient jet engine [PNR-90114] p 7 N83-11136
- Advanced Gas Turbine (AGT) powertrain system development program --- automobile engines [NASA-CR-169475] p 128 N83-12088
- Advanced Gas Turbine (AGT) powertrain system development for automotive applications [NASA-CR-165178] p 129 N83-12431
- Advanced Gas Turbine (AGT) powertrain system development for automotive applications [NASA-CR-165329] p 132 N83-13038
- Automotive Stirling engine development program [NASA-CR-167907-1] p 140 N83-15177
- ENGINE PARTS**
- Advanced Gas Turbine (AGT) powertrain system development program --- automobile engines [NASA-CR-169475] p 128 N83-12088
- ENGINE TESTING LABORATORIES**
- Investigation of the performance of a Ford 4.1 L 6 cylinder SI engine operating on methanol iso-butanol gasoline fuel blends [AD-A117746] p 84 N83-10426
- ENGINE TESTS**
- Test results of a medium temperature solar engine p 115 A83-16000
- Radiant heating tests of several liquid metal heat-pipe sandwich panels [AIAA PAPER 83-0319] p 157 A83-16649
- Recent tests on the Carter small reciprocating steam engines p 43 N83-10536
- Modifications and testing of a 4-95 Stirling engine for solar applications p 44 N83-10538
- Combustion characteristics of hydrogen Carbon monoxide based gaseous fuels [NASA-TM-82998] p 76 N83-10560
- Cold-air performance of compressor-driven turbine of Department of Energy upgraded automobile gas turbine engine 2 Stage performance [NASA-TM-82818] p 127 N83-11063
- ENGINES**
- A conceptual study of the potential for automotive-derived and free-piston Stirling engines in 30- to 400-kilowatt stationary power applications [NASA-CR-165274] p 121 N83-10568
- Assessment of alternative power sources for mobile mining machinery [NASA-TM-82695] p 136 N83-14691
- ENTHALPY**
- Development of instrumental methods of analysis of sulfur compounds in coal process streams [DE82-003253] p 108 N83-14775
- ENVIRONMENTAL EFFECTS**
- Ice distribution and winter surface circulation patterns, Kachemak Bay, Alaska p 1 A83-12038
- Environmental isolation task p 41 N83-10521

- Impact of alternate energy sources in the Greater Egypt region Franklin, Jackson, Jefferson, Perry and Williamson Counties, Illinois p 6 N83-10642
- Arctic terrestrial environmental research programs of the Office of Energy Research, Department of Energy Evaluation and recommendations. Appendix A Terrestrial environmental research in Alaska during 1980-1981 [PB82-181090] p 9 N83-11633
- Arctic terrestrial environment research programs of the Office of Energy Research, Department of Energy Evaluation and recommendations [PB82-197088] p 9 N83-11634
- Summary outline of DOE geoscience and geoscience related research [DE82-008203] p 97 N83-12480
- Coal to methanol feasibility study: Beluga methanol project. Volume 4 Environmental [DE82-008057] p 10 N83-12542
- Source test and evaluation report: Alcohol facility for gasohol production [PB82-237041] p 101 N83-13280
- Total energy food plant 21 million gallon ethanol facility [DE82-019258] p 14 N83-13617
- A reference-material system for estimating health and environmental risks of selected material cycles and energy systems [DE82-018309] p 15 N83-13647
- Effects of oil on tundra ponds and streams [DE82-018899] p 15 N83-13649
- Environmental assessment of stationary source NOx control technologies [PB82-248350] p 16 N83-13665
- Health effects research in direct coal liquefaction Studies of H-coal distillates Phase 1 PDU samples, the effects of hydrotreatment [DE82-003702] p 18 N83-14302
- Boiler efficiency and emissions testing using Refuse-Derived Fuel (RDF) and coal [AD-A118291] p 19 N83-14772
- ENVIRONMENTAL MANAGEMENT**
- Developing Alaska's energy resources Actions needed to stimulate research and improve wetlands permit processing [GAO/EMD-82-44] p 18 N83-14664
- ENVIRONMENTAL POLLUTION**
- Automatic interpretation of MSS-LANDSAT data applied to coal refuse site studies in southern Santa Catarina State, Brazil [E83-10066] p 18 N83-14575
- Risks, regulation responsibilities and costs in nuclear waste management: A preliminary survey in the European Community [EUR-6893] p 21 N83-15115
- Study of the formation of submicron particulates generated by coal combustion [DE82-003268] p 21 N83-15401
- ENVIRONMENTAL PROTECTION**
- Program guide to used oil recycling [DOE/CS-40402/1] p 104 N83-14178
- Developing Alaska's energy resources Actions needed to stimulate research and improve wetlands permit processing [GAO/EMD-82-44] p 18 N83-14664
- Nuclear and coal waste disposal hampered by legal, regulatory and technical uncertainties [EMD-82-63] p 19 N83-14770
- ENVIRONMENTAL ENGINEERING**
- Operational considerations on the moon-day project p 38 A83-19148
- ENVIRONMENTAL MONITORING**
- The use of near color infrared photography to assess the impact of the oil and natural gas industry on Louisiana's wetlands p 1 A83-10069
- Environmental monitoring of the Athabasca Oil Sands using Landsat data p 79 A83-11988
- Environmental monitoring of the Athabasca Oil Sands Region p 80 A83-14238
- Background levels and environmental cycling of petroleum hydrocarbons Multimedia monitoring requirements p 11 N83-12630
- Quality assurance in support of energy related monitoring activities [PB82-234238] p 16 N83-13657
- Environmental and regulatory aspects of compressed-air energy storage [DE82-003868] p 19 N83-14757
- ENVIRONMENTAL TESTS**
- General contamination criteria for optical surfaces --- instrument performance losses in spaceborne conditions p 29 A83-13743
- Environmentally induced discharges in a solar array p 38 A83-17493
- Dish Stirling system integration and test progress report p 44 N83-10539

ENVIRONMENTS

- Biomedical and environmental sciences programs at the Oak Ridge National Laboratory [DE82-019897] p 13 N83-13516

EQUATIONS OF MOTION

- Investigation of the equations of motion of the heliostats of a tower-type solar electric power plant p 31 A83-15133

EQUATIONS OF STATE

- Liquid-vapor equilibrium for ternary natural gas system [PB82-227679] p 82 N83-10160

EQUILIBRIUM EQUATIONS

- Energy balance in TM-1-MH Tokamak (ohmic heating) p 151 N83-16122
- Equidensitometrical evaluation of a film record of an SF6 switching arc p 153 N83-16136

EQUIPMENT SPECIFICATIONS

- Photovoltaic systems measurements - Status and perspectives p 32 A83-15461
- Experience with specifications applicable to certification --- of photovoltaic modules for large-scale application p 32 A83-15463

- Correlation of design with performance of primary lithium-sulfur oxyhalide cells [NASA-CR-169369] p 120 N83-10504
- Advanced Gas Turbine (AGT) powertrain system development program --- automobile engines [NASA-CR-169475] p 128 N83-12088

EQUIVALENT CIRCUITS

- Study of electrical faults in magnetohydrodynamic Faraday generators p 116 A83-16106

EROSION

- Review of plasma-impurity sources during Tokamak operation [DE82-017098] p 126 N83-10951

ESTIMATING

- A reference-material system for estimating health and environmental risks of selected material cycles and energy systems [DE82-018309] p 15 N83-13647

ETHANE

- Fluidized-bed pyrolysis of oil shale Oil yield, composition, and kinetics [DE82-021010] p 97 N83-12571

ETHYL ALCOHOL

- Estimated capacity of US ethanol plants [PB82-203647] p 82 N83-10154
- Performance and emissions characteristics of aqueous alcohol fumes in a DI diesel engine [NASA-CR-167917] p 96 N83-12250

- Status of alcohol-fuels-utilization technology for highway transportation A 1981 perspective Volume 1 Spark-ignition engines [DE82-020493] p 96 N83-12255

- Alcohol as a fuel for farm and construction equipment [DE82-021022] p 100 N83-13277

- Source test and evaluation report. Alcohol facility for gasohol production [PB82-237041] p 101 N83-13280

- Total energy food plant 21 million gallon ethanol facility [DE82-019258] p 14 N83-13617

- The Tennessee Valley Authority's biomass fuels program [DE81-904161] p 109 N83-15495

EUROPEAN COMMUNICATIONS SATELLITE

- Further developments of the ECS solar array p 64 N83-14715

EUROPEAN SPACE PROGRAMS

- Current topics of SPS realization from a European viewpoint p 156 A83-11283
- Announcement of an opportunity for space calibration of solar cells p 65 N83-14719

EVALUATION

- Diesel driven low capacity heat pump for heating and hot water production [BMFT-FB-T-82-128] p 7 N83-11592

- A preliminary evaluation of a potential space worth encapsulant p 72 N83-15832
- Evaluation of solar cell welds by scanning acoustic microscopy p 72 N83-15834

EVAPORATION

- Phase equilibrium studies for methane/synthesis gas separation The hydrogen-carbon monoxide-methane system [PB82-200637] p 95 N83-12208

- Heat pipe thermal switch [NASA-CASE-GSC-12812-1] p 159 N83-12525

EVAPORATIVE COOLING

- Development of the trickle roof cooling and heating system Experimental plan [DE82-019082] p 57 N83-13615

- Two-phase heat transport for thermal control p 159 N83-15894

SUBJECT INDEX

EVAPORATORS

Assessment of high heat-transfer evaporators as power plant condensers to produce abundant freshwater [PB82-198045] p 7 N83-11277

EXCITATION

Helium population model p 154 N83-18139

EXHAUST EMISSION

NOx formation experiments in an MHD simulation facility p 116 A83-18103

Design of a low emission combustor for an automotive gas turbine [AIAA PAPER 83-0338] p 117 A83-16664

Evaluation of advanced combustion concepts for dry NO sub x suppression with coal-derived, gaseous fuels [NASA-TM-82985] p 85 N83-10557

Multifuel evaluation of rich/quench/lean combustor [NASA-TM-82986] p 86 N83-10559

Determination of a range of concern for mobile source emissions of hydrogen sulfide [PB82-201773] p 6 N83-10663

Development of criteria for extension of applicability of low-emission, high-efficiency coal burners [PB82-197153] p 83 N83-11377

Performance and emissions characteristics of aqueous alcohol fumes in a DI diesel engine [NASA-CR-187917] p 96 N83-12250

Characterization of diesel emissions from operation of a light-duty diesel vehicle on alternate source diesel fuels [PB82-232448] p 101 N83-13281

Characterization of diesel emissions from operation of a light-duty diesel vehicle on alternate source diesel fuels [PB82-234147] p 101 N83-13282

Evaluation of short-term NO2 plume models for point sources Volume 1 Technical discussion [PB82-234329] p 16 N83-13858

Pilot-scale assessment of conventional particulate control technology for pressurized fluidized-bed combustion emissions [PB82-230921] p 103 N83-13673

EXHAUST GASES

A thermal desorption cold-trap unit for gaschromatographic analysis of gaseous organic pollutants [PB82-206368] p 3 N83-10152

Combustion of coal gas fuels in a staged combustor [NASA-TM-82987] p 85 N83-10556

Compilation of air pollutant emission factors, supplement 12 [PB82-184722] p 6 N83-10654

Fumigation of alcohol in a light duty automotive diesel engine [NASA-CR-187915] p 100 N83-13272

EXOTHERMIC REACTIONS

Lithium-sulfur dioxide (Li/SO2) battery safety hazards Thermal studies [AD-A119381] p 163 N83-13591

EXPANSION

Analytical mode for interim expansion of electrical energy generating systems [INPE-2558-TDL/104] p 129 N83-12520

EXPERIMENT DESIGN

Demonstration Tokamak power plant study [DE82-016182] p 125 N83-10937

Electrical aspects of photovoltaic-system simulation [DE82-021956] p 53 N83-12568

EXPERIMENTATION

Pressure-swinging underground gasification. Theoretical and experimental investigations of gasification, phase 2 [BMFT-FB-T-82-066] p 89 N83-10615

EXPLORATION

Geologic studies of geopressured and hydrogeopressured zones in Texas. Test well site selection [PB82-220542] p 94 N83-11653

Geothermal power development in Hawaii Volume 1 Review and analysis [DE82-020077] p 10 N83-12544

Hydrogeochemical and stream-sediment reconnaissance basic data for Utica quadrangle, New York. Uranium Resource Evaluation Project [DE82-020429] p 102 N83-13552

Hydrogeochemical and stream-sediment reconnaissance basic data for Marion, Canton, Pittsburgh and Cleveland quadrangles, Ohio, West Virginia, Pennsylvania. Uranium Resource Evaluation Project [DE82-020430] p 102 N83-13553

Hydrogeochemical and stream-sediment reconnaissance basic data for Beaumont, Lake Charles and Baton Rouge quadrangles, Texas, Louisiana. Uranium Resource Evaluation Project [DE82-020438] p 102 N83-13554

Hydrogeochemical and stream-sediment reconnaissance basic data for Ogdensburg and Lake Champlain quadrangles, New York, Vermont. Uranium Resource Evaluation Project [DE82-020417] p 102 N83-13557

Hydrogeochemical and stream-sediment reconnaissance basic data for Jenkins Quadrangle, Kentucky, Virginia, West Virginia. Uranium resource evaluation project [DE82-020431] p 102 N83-13558

EXPLOSIVES Spectroscopic studies of the hazards of Li/SOC12 batteries during anode-limited cell reversal p 114 A83-12056

EXPLOSIVES Evaluation of a sheathed permissible explosive charge for open shooting in flammable atmospheres Adobe charge program [PB82-220732] p 103 N83-13638

EXTRACTION Investigation of extracts by fluidized bed extraction [BMFT-FB-T-82-068] p 81 N83-10142

Numerical simulation of fluid flow in porous/fractured media [DE82-002631] p 107 N83-14454

F

FABRICATION

Self-annealed ion implanted solar cells p 25 A83-12290

Fabrication and development of several heat pipe honeycomb sandwich panel concepts — airframe integrated scramjet engine [NASA-CR-165982] p 170 N83-10379

Ceramic high temperature receiver design and tests [NASA-CR-167987] p 44 N83-10544

Design and fabrication of composite blades for the Mod-1 wind turbine generator [DE82-018410] p 128 N83-11579

Efficiency-improvement study for GaAs solar cells [NASA-RP-1099] p 48 N83-11585

Lithium/sulfur dioxide cell and battery safety [DE82-017353] p 135 N83-14684

FAILURE Protection of large capacitor banks [DE82-017353] p 120 N83-10366

FAILURE ANALYSIS Environmental isolation task p 41 N83-10521

Engineering sciences area and module performance and failure analysis area p 41 N83-10523

Materials technology for coal-conversion processes [Alcoa ALVAVT program] p 96 N83-12253

FARADAY EFFECT Study of electrical faults in magnetohydrodynamic Faraday generators p 118 A83-18106

Coupled three-dimensional flow and electrical calculations for Faraday MHD generators p 117 A83-18107

Faraday-rotation measurements in ISX-B [DE82-011507] p 127 N83-10953

FAST NUCLEAR REACTORS Enhanced heat pipe theory and operation p 145 N83-15893

FATIGUE LIFE A review of aero-generator fatigue problems p 119 A83-18939

Forced vibration analysis of rotating structures with application to vertical axis wind turbines [DE82-000620] p 133 N83-13625

FAULT TOLERANCE Economic modeling of fault tolerant flight control systems in commercial applications p 1 A83-11156

FEASIBILITY The joint Australia/Federal Republic of Germany feasibility study on the conversion of Australian coals into liquid fuels in Australia [BMFT-FB-T-82-133] p 94 N83-11595

FEASIBILITY ANALYSIS Aerodynamic platform comparison for jet-stream electricity generation p 116 A83-18102

Inflow disk generator for open-cycle MHD power generation p 116 A83-18104

PKI solar thermal plant evaluation at Capitol Concrete Products, Topeka, Kansas p 43 N83-10535

Panel discussions. Industrial support sector requirements p 4 N83-10550

A conceptual study of the potential for automotive-derived and free-piston Stirling engines in 30- to 400-kilowatt stationary power applications [NASA-CR-165274] p 121 N83-10568

Geothermal community heating for Cape Charles, Virginia [PB82-184003] p 91 N83-10640

FINITE ELEMENT METHOD

State-of-the-art of acoustic instrumentation for coal-conversion plants [DE82-004037] p 96 N83-12254

The climate of Africa, including feasibility study of climate alert system p 170 N83-12737

Feasibility study of a fission-suppressed tandem-mirror hybrid reactor [DE82-018375] p 134 N83-13997

Feasibility study of solid surface subreflector production techniques [NASA-CR-169642] p 60 N83-14678

Outlook for space energy systems at the end of the three-year assessment p 18 N83-14734

Assessment/review of methanol technology and utilization as a fuel [AD-A120109] p 109 N83-15489

Potential role and technology status of closed-cycle MHD for light-weight nuclear space-power systems p 142 N83-15853

Preliminary analysis of wave energy conversion at an offshore structure [AD-A120079] p 146 N83-15903

FEDERAL BUDGETS

National photovoltaic program p 3 N83-10506

FEEDBACK CONTROL

Multivariable stability-margin optimisation with decoupling and output regulation p 2 A83-16191

Fully controllable heat pipe containing a short electro-osmotic pumping section [AIAA PAPER 83-0317] p 157 A83-16647

Radial effects in heating and thermal stability of a sub-ignited Tokamak [DE82-009384] p 124 N83-10932

FEEDERS

Modification of feed/effluent flow work exchangers for slurry service and power recovery in coal liquefaction processes [DE82-004114] p 110 N83-15499

FERMENTATION Microbiological studies towards optimization of methane from marine plant biomass [PB82-214382] p 92 N83-10756

Technical and economic assessment of processes for the production of butanol and acetone [NASA-CR-189623] p 106 N83-14293

FERRITIC STAINLESS STEELS

Stress-corrosion studies in coal-liquefaction environments [DE82-001484] p 100 N83-13240

Ferroelectricity

Study of the photovoltaic effect in thin film barium titanate [NASA-CR-189435] p 48 N83-10567

FIBER OPTICS

Transport of solar energy with optical fibres p 29 A83-13698

FIBERS

Ceramics for high power sources in space [IPPJ-607] p 171 N83-15881

FIELD COILS

Non-circular bumpy torus [IPPJ-607] p 134 N83-13990

FIELD MODE THEORY

Ion kinetic effects on the tilt mode in FRCs [DE82-002329] p 155 N83-16227

FIGHTER AIRCRAFT

The application of energy saving concepts to future fighter/attack aircraft design [AIAA PAPER 83-0092] p 2 A83-16516

Aircraft thrust/power management can save defense fuel, reduce engine maintenance costs, and improve readiness [GAO/PLRD-82-74] p 18 N83-14074

FILM THICKNESS

Liquid ribbon radiator for lightweight space radiator systems p 145 N83-15895

FILTRATION

An economic and engineering analysis of the full-scale trommel screen operations at Baltimore County, Maryland p 87 N83-10581

FINES

Physicochemical cleaning and recovery of coal p 87 N83-10577

FINITE DIFFERENCE THEORY

Thermal storage performance calculations by closed form and finite difference solutions [ASME PAPER 82-HT-52] p 28 A83-12799

Transient performance of evacuated tubular solar collectors p 27 A83-13478

FINITE ELEMENT METHOD

On the optimization of magnetic field sources in electromechanical energy conversion p 112 A83-10641

Analytical prediction of the dynamic in-orbit behavior of large flexible solar arrays p 65 N83-14723

FIRING (IGNITING)

FIRING (IGNITING)

Volatile production during preignition heating
[DE82-003061] p 109 N83-15402

FLAMES

Particulate processes in pulverized coal flames
[DE82-003370] p 76 N83-14204

FLAMMABILITY

Antimisting kerosene atomization and flammability
[NASA-CR-169385] p 95 N83-12246

FLAMMABLE GASES

Computerized, remote monitoring systems for underground coal mines Fires and explosive atmospheres
[PB82-221359] p 3 N83-10481

Evaluation of a sheathed permissible explosive charge for open shooting in flammable atmospheres Adobe charge program
[PB82-220732] p 103 N83-13636

FLASHING (VAPORIZING)

Flash hydrolysis of coal for conversion to liquid and gaseous fuels
[DE82-019435] p 100 N83-13197

FLAT PLATES

Transient performance of evacuated tubular solar collectors
p 27 A83-13478
50 per cent more output power from an albedo-collecting flat panel using bifacial solar cells p 29 A83-13700

Flat Plate Solar Array Project Proceedings of the 20th Project Integration Meeting
[NASA-CR-169370] p 39 N83-10505

Block 5 module design summary p 40 N83-10510
Flat-plate collector research area Silicon material task p 41 N83-10519

Large-area silicon sheet task p 41 N83-10520
Environmental isolation task p 41 N83-10521

Cell and module formation research area p 41 N83-10522
Engineering sciences area and module performance and failure analysis area p 41 N83-10523

Project analysis and integration area p 41 N83-10524
Wood Road School, Ballston Spa, New York solar-energy-system performance evaluation, November 1981 - April 1982

[DE82-021301] p 54 N83-12586
Contact stresses on a thin plate after large displacements to a full parabolic surface
[DE82-005712] p 55 N83-13504

Summary of flat-plate solar array project documentation Abstracts of published documents, 1975 to June 1982
[NASA-CR-169518] p 56 N83-13586

A companion of unglazed flat plate liquid solar collector thermal performance using the ASHRAE Standard 96-1980 and modified BSE test procedures
[PB82-237660] p 58 N83-13632

Development of photovoltaic array and module safety requirements p 60 N83-14681
[NASA-CR-169641] p 60 N83-14681

Flat plate solar collectors p 68 N83-14764
[BMFT-FB-T-82-139] p 68 N83-14764

FLEXIBLE BODIES

Flexible gas insulated cable for high power transmission p 158 N83-10370
[BMFT-FB-T-82-099] p 158 N83-10370

Ultralightweight solar array technology - spacecraft power p 66 N83-14729

FLIGHT CREWS

Testing of an improved lithium-sulfur dioxide battery for aircraft life support equipment
[AD-A119374] p 163 N83-13592

FLIGHT OPERATIONS

Fuel savings in air transport p 2 A83-19150

FLIGHT PATHS

Estimation of aircraft fuel consumption p 1 A83-10186

FLIGHT SIMULATION

Simulated space flight testing of commercial terrestrial silicon cells p 69 N83-15811

FLIGHT TESTS

Flight to determine the power demand of a helicopter control system on the basis of flight tests p 1 A83-10439

Measured performance of a tip-controlled, teetered rotor with an NACA 64 sub 3-618 tip airfoil
[NASA-TM-82870] p 136 N83-14689

NASA solar array flight experiment p 65 N83-14722

FLOTATION

Petrographic evaluation of pyrite in the products from two-stage coal-pyrite flotation
[DE82-003593] p 105 N83-14208

FLOW DISTRIBUTION

Mathematical model for the analysis of wind-turbine wakes p 117 A83-16108

Frictional characteristics and heat transfer of antimisting fuels in tubes p 96 N83-12248
[NASA-CR-169388] p 96 N83-12248

Analysis of preburn three-dimensional flow patterns in underground coal conversion
[DE82-002405] p 110 N83-15496

FLOW MEASUREMENT

Gust structure analysis for WECS Design and performance analysis
[DE82-005321] p 137 N83-14746

FLOW THEORY

Momentum theory, dynamic inflow, and the vortex-ring state p 116 A83-16026

Heat transfer - A review of 1981 literature p 169 A83-17701

FLOW VELOCITY

Fully controllable heat pipe containing a short electro-osmotic pumping section
[AIAA PAPER 83-0317] p 157 A83-16647

FLOWMETERS

State-of-the-art of acoustic instrumentation for coal-conversion plants
[DE82-004037] p 96 N83-12254

FLUE GASES

Reconstruction and testing of the flue gas desulfurizing plant Weiher 2
[BMFT-FB-T-82-108] p 91 N83-10652

Advanced regenerative heat recovery system
[PB82-200650] p 8 N83-11604

Thermodynamic data for desulfurization processes
[PB82-184904] p 95 N83-12207

Mechanisms of dry SO₂ control processes
[PB82-196924] p 12 N83-12668

Sampling for high-molecular-weight organic compounds in power plant stack gases
[PB82-234618] p 16 N83-13659

Impact of NO_x selective catalytic reduction processes on flue gas cleaning systems
[PB82-240086] p 16 N83-13664

Pilot-scale assessment of conventional particulate control technology for pressurized fluidized-bed combustion emissions
[PB82-230921] p 103 N83-13673

Improvement of electrostatic precipitators performance through conditioning by flue gas
[BMFT-FB-T-82-123] p 20 N83-14783

FLUENCE

Solar cell radiation handbook
[NASA-CR-169662] p 61 N83-14687

Basis for equivalent fluence concept in space solar cells p 71 N83-15827

Radiation damage p 72 N83-15837

FLUES

Laboratory research for desulfurizing and NO-reduction by addition of ammonia under the conditions of the Bergbau-Forschung flue gas desulfurizing process
[BMFT-FB-T-82-147] p 9 N83-11617

FLUID DYNAMICS

An update of the electrofluid dynamics wind driven generators p 149 N83-15936

FLUID FILTERS

Pilot-scale assessment of conventional particulate control technology for pressurized fluidized-bed combustion emissions
[PB82-230921] p 103 N83-13673

FLUID FLOW

Numerical simulation of fluid flow in porous/fractured media
[DE82-002631] p 107 N83-14454

FLUID MECHANICS

Heat Transfer and Fluid Mechanics Institute, Meeting, 28th, California State University, Sacramento, CA, June 28, 29, 1982, Proceedings p 37 A83-18451

FLUIDIZED BED PROCESSORS

Investigation of extracts by fluidized bed extraction
[BMFT-FB-T-82-068] p 81 N83-10142

Coal gasification of steam-soluted catalyst
[BMFT-FB-T-82-073] p 81 N83-10143

Computer modeling of mixing and agglomeration in coal-conversion reactors Volume 1 Model formulation
[DE82-014836] p 84 N83-10212

Development of a solid waste fired fluidized boiler, phase 1 p 88 N83-10592

Steam gasification of coal, project prototype plant nuclear process heat Report at the end of the reference phase
[BMFT-FB-T-82-069] p 90 N83-10616

Technical study on the possibilities of oil shale combustion in a fluidized bed furnace including cost estimates for a plant to be built
[BMFT-FB-T-82-085] p 90 N83-10623

Computerized simulation of the dynamic response of a coal-fired power plant with pressurized fluidized bed
[BMFT-FB-T-82-094] p 90 N83-10629

Steam generator with circulating atmospheric fluidized bed combustion
[BMFT-FB-T-82-134] p 94 N83-11596

Fluidized-bed combustion Combustion of run-of-mine coal in a 12-inch-diameter pressurized fluidized-bed combustor
[DE82-018786] p 95 N83-12204

Fluidized-bed pyrolysis of oil shale Oil yield, composition, and kinetics
[DE82-021010] p 97 N83-12571

Pilot-scale assessment of conventional particulate control technology for pressurized fluidized-bed combustion emissions
[PB82-230921] p 103 N83-13673

Advanced concepts The second generation of compressed air-energy storage technology
[DE82-003838] p 167 N83-14755

FLUIDS

Superior heat-transfer fluids for solar heating and cooling applications Results of acute oral-toxicity determinations
[DE82-002758] p 52 N83-12560

FLUORESCENCE

Experimental feasibility of the airborne measurement of absolute oil fluorescence spectral conversion efficiency
p 169 A83-18581

Solar energy conversion based on the principle of fluorescent collectors
[BMFT-FB-T-82-081] p 47 N83-10621

FLUOROCARBONS

Coating of laser fusion targets by plasma polymerized organic thin films p 152 N83-16126

FLUTTER

Aeroelastic stability analysis of a Darnes wind turbine
[DE82-017001] p 121 N83-10603

FLUX (RATE)

Neutron attenuation in the laser ducts of an inertial-confinement fusion reactor
[DE82-007195] p 126 N83-10947

FLUX DENSITY

Proceedings of a Symposium on High Energy Density Capacitors and Dielectric Materials
[PB82-197344] p 160 N83-10373

Scatterplate flux mapping for solar concentrators
[DE82-021359] p 54 N83-12588

High-current pulses from inductive energy stores
[DE82-004366] p 167 N83-15587

Soft X-ray and VUV emission from REB-heated plasma in REBEX 1 and REBEX 1 machines p 152 N83-16130

FLY ASH

Performance characteristics of heavy media cyclones using fly ash-derived heavy media p 86 N83-10574

FLYING PLATFORMS

On the rotary wing concept for jet stream electricity generation p 117 A83-16111

FLYWHEELS

Composite-material flywheels and containment systems p 161 N83-11017

Stationary flywheel energy storage systems
[PB82-238130] p 165 N83-13637

Research needs Prime-power for high energy space systems
[AD-A119243] p 135 N83-14156

Design of plywood and paper flywheel rotors p 165 N83-14662

FOCUSING

A point focusing collector for an integrated water/power complex p 44 N83-10541

FOKKER-PLANCK EQUATION

Stabilization of axisymmetric mirror plasma by energetic ion injections
[DE81-030341] p 155 N83-16229

FORCED CONVECTION

A groundwater convection model for Rio Grande rift geothermal resources p 79 A83-11831

FORCED VIBRATION

Forced vibration analysis of rotating structures with application to vertical axis wind turbines
[DE82-000620] p 133 N83-13625

FORECASTING

Energy for agriculture in Pakistan
[IIASA-RR-82-20] p 3 N83-10499

Residential End-use Energy Planning System (REEPS)
[DE82-906444] p 14 N83-13619

FOSSIL FUELS

Automated probe microdistillation/mass spectrometry for the analysis of high-molecular weight compounds in fossil fuels
[PB82-022039] p 95 N83-12202

Summary outline of DOE geoscience and geoscience related research
[DE82-008203] p 97 N83-12480

Population hazards resulting from the combustion of fossil fuels and the nuclear power industry
[BLL-RISLEY-TR-4173-(9091 9)] p 11 N83-12594

SUBJECT INDEX

FUSION REACTORS

Atmosphere-biosphere interactions: Toward a better understanding of the ecological consequences of fossil fuel combustion p 12 N83-12672
 [PB82-182098]
 Evaluation of short-term NO₂ plume models for point sources Volume 1 Technical discussion p 16 N83-13658
 [PB82-234329]
FOULING
 An assessment of gas-side fouling in cement plants [NASA-CR-169513] p 15 N83-13644
 Study of the formation of submicron particulates generated by coal combustion [DE82-003268] p 21 N83-15401
FOUNDRIES
 Compilation of air pollutant emission factors, supplement 12 [PB82-184722] p 6 N83-10654
FRACTIONATION
 Corrosion in fractionation systems [DE82-001441] p 109 N83-15427
FRACTURING
 Summary outline of DOE geoscience and geoscience related research [DE82-008203] p 97 N83-12480
FREEZING
 Thermal analysis of the position of the freezing front around an LNG in-ground storage tank with a heat barrier p 110 N83-15712
 Study of the freezing pressure acting on a shaft lining p 110 N83-15732
FREQUENCY MODULATION
 Instrument landing system localizer receiver performance in the presence of co-channel interference [AD-A118909] p 99 N83-13089
FRESH WATER
 Assessment of high heat-transfer evaporators as power plant condensers to produce abundant freshwater [PB82-198045] p 7 N83-11277
FRESNEL LENSES
 A transmittance-optimized, point-focus Fresnel lens solar concentrator p 42 N83-10530
 Results of testing a development module of the second-generation E-systems concentrating photovoltaic-thermal module [DE82-015671] p 46 N83-10598
FRESNEL REFLECTORS
 The PKI collector p 42 N83-10528
FUEL CELL POWER PLANTS
 On the 40kW test power plant modification and development, phase 2 [PB82-216102] p 122 N83-10637
FUEL CELLS
 Catalytic autothermal reforming increases fuel cell flexibility p 74 N83-11794
 Batteries and fuel cells Design, employment, chemistry --- German book p 115 N83-14041
 The effect of thickness on the performance of molten carbonate fuel cell cathodes p 115 N83-15869
 Research on oxidation by air and tempering of Raney nickel electrocatalysts for the H₂ anodes of alkali combustion materials cells --- German thesis p 119 N83-18494
 Pore size engineering applied to starved electrochemical cells and batteries [NASA-TM-82893] p 119 N83-10134
 Ocean thermal energy at the Johns Hopkins University Applied Physics Laboratory [PB82-215054] p 122 N83-10639
 Crude gas/air fuel cells with a phosphoric acid matrix [BMFT-FB-T-82-167] p 128 N83-11601
 Internal reforming for natural gas fueled molten carbonate fuel cells [PB82-200676] p 128 N83-11607
 Technology-base research project for electrochemical storage report for 1981 [DE82-020599] p 163 N83-12573
 Metal chelate catalysts for fuel cells [PB82-195637] p 131 N83-12592
 The 40kW fuel cell field test support [PB82-231630] p 133 N83-13633
 Assessment/review of methanol technology and utilization as a fuel [AD-A120109] p 109 N83-15489
 Application of fuel cells to highway and nonhighway transportation [DE82-004365] p 156 N83-16259
FUEL COMBUSTION
 Tests of blending and correlation of distillate fuel properties p 78 N83-11050
 NO_x results from two combustors tested on medium BTU coal gas p 78 N83-11493
 An experimental study of fuel combustion in a high-temperature air counterflow p 79 N83-14056
 An experimental study and modeling of heat transfer in boilers of small and medium power --- French thesis p 80 N83-15841

NO_x formation experiments in an MHD simulation facility p 116 N83-18103
 Combustion of coal gas fuels in a staged combustor [NASA-TM-82887] p 85 N83-10556
 Evaluation of advanced combustion concepts for dry NO sub x suppression with coal-derived, gaseous fuels [NASA-TM-82985] p 85 N83-10557
 Multifuel evaluation of rich/quench/lean combustor [NASA-TM-82988] p 86 N83-10559
 Technical study on the possibilities of oil shale combustion in a fluidized bed furnace including cost estimates for a plant to be built [BMFT-FB-T-82-085] p 90 N83-10623
 Symposium on Pulse-Combustion Applications and Condensing Heat Exchangers [PB82-184086] p 91 N83-10841
 Compilation of air pollutant emission factors, supplement 12 [PB82-184722] p 6 N83-10654
 Steam generator with circulating atmospheric fluidized bed combustion [BMFT-FB-T-82-134] p 94 N83-11596
 Alcohol as a fuel for farm and construction equipment [DE82-021022] p 100 N83-13277
 Installation of a diesel engine combustion/ignition evaluation facility [AD-A119610] p 104 N83-14189
 CaO interactions in the staged combustion of coal [DE82-003273] p 105 N83-14205
 Catalytic combustion with steam injection [NASA-TM-82923] p 111 N83-15805
 Analysis of combustion spectra containing organ pipe tone by cepstral techniques [NASA-TM-83034] p 77 N83-16153
FUEL CONSUMPTION
 Estimation of aircraft fuel consumption p 1 N83-10186
 The application of energy saving concepts to future fighter/attack aircraft design [AIAA PAPER 83-0092] p 2 N83-16516
 Fuel savings in air transport p 2 N83-19150
 The fuel efficient jet engine [PNR-90114] p 7 N83-11138
 Energy efficient engine Flight propulsion system preliminary analysis and design [NASA-CR-159859] p 9 N83-12094
 Assessment of current and projected future trends in light-duty-vehicle fuel switching Subtask 1 [DE82-018816] p 97 N83-12440
 Aircraft thrust/power management can save defense fuel, reduce engine maintenance costs, and improve readiness [GAO/PLRD-82-74] p 18 N83-14074
 Improving energy efficiency of major weapon systems [AD-A119563] p 18 N83-14116
 Self-excited MHD power source for space applications p 141 N83-15849
FUEL INJECTION
 Catalytic combustion with steam injection [NASA-TM-82923] p 111 N83-15805
FUEL PRODUCTION
 Developing technologies for synthetic fuels p 78 N83-10658
 Estimated capacity of US ethanol plants [PB82-203647] p 82 N83-10154
 Demonstration of landfill gas enhancement techniques in landfill simulators p 88 N83-10594
 Research, development and demonstration in the design of sanitary landfill to optimize the generation and capture of compressible gas p 89 N83-10595
 Landfill gas recovery: An analysis of results p 89 N83-10596
 Performance analysis of cofiring densified refuse derived fuel in a military boiler [AD-A118022] p 93 N83-11583
 The joint Australia/Federal Republic of Germany feasibility study on the conversion of Australian coals into liquid fuels in Australia [BMFT-FB-T-82-133] p 94 N83-11595
 Coal to methanol feasibility study: Beluga methanol project. Volume 4 Environmental [DE82-006057] p 10 N83-12542
 Summary of DOE Hydrogen Program FY-1981 by the Hydrogen Energy Coordinating Committee [DE82-020494] p 76 N83-13276
 Source test and evaluation report: Alcohol facility for gasoline production [PB82-237041] p 101 N83-13280
 Basic Research Opportunities for Lasting Fuel Gas Supplies from Inorganic Resources. Report of a Workshop College Station, 8 Jun. - 14 Aug. 1981 [PB82-231671] p 101 N83-13284
 Methane hydrate gas production: Evaluating and exploiting the solid gas resource [DE82-004373] p 110 N83-15498

FUEL SYSTEMS
 Automotive Stirling Engine Mod 1 Design Review, volume 2 [NASA-CR-167938] p 127 N83-10991
FUEL TESTS
 Tests of blending and correlation of distillate fuel properties p 78 N83-11050
 A carbon-13 and proton nuclear magnetic resonance study of some experimental referee broadened-specification /ERBS/ turbine fuels p 78 N83-11482
FUEL-AIR RATIO
 Design of a low emission combustor for an automotive gas turbine [AIAA PAPER 83-0338] p 117 N83-16664
FUELS
 Combustion characteristics of hydrogen Carbon monoxide based gaseous fuels p 76 N83-10560
 [NASA-TM-82988]
 Sewage sludge as a supplementary utility boiler fuel p 88 N83-10590
 Biomass fuels update TVAs biomass fuels program [DE82-904990] p 89 N83-10613
 Program of basic research on the utilization of coal-water mixture fuels [DE82-002232] p 106 N83-14299
 Investigation of engineering and design considerations in selecting conveyors for densified Refuse-Derived Fuel (dRDF) and dRDF Coal mixtures [AD-A119065] p 107 N83-14495
 Boiler efficiency and emissions testing using Refuse-Derived Fuel (RDF) and coal [AD-A119291] p 19 N83-14772
 Assessment/review of methanol technology and utilization as a fuel [AD-A120109] p 109 N83-15489
 Evaluation of plasma jet ignition for improved performance of alternate fuels [AD-A120160] p 112 N83-16212
FUMIGATION
 Fumigation of alcohol in a light duty automotive diesel engine [NASA-CR-167915] p 100 N83-13272
FUNCTIONAL DESIGN SPECIFICATIONS
 Low Earth orbit blanket technologies for the power range of 15-60 kW p 61 N83-14696
 Aspects of end of life design for solar cells p 63 N83-14706
 Fifth Biennial Wind Energy Conference and Workshop (WW5) [DE82-014659] p 146 N83-15908
 Status of the 4 MW WTS-4 wind turbine p 148 N83-15921
 DOE/UTRC kW development program p 74 N83-15924
FUNCTIONS (MATHEMATICS)
 Analytic tools for the electrical design of solar generators p 66 N83-14727
FURNACES
 A laboratory approach to obtain suspension combustion data for reuse derived fuels p 87 N83-10579
 Utilization of the waste heat of a steel work [BMFT-FB-T-82-135] p 8 N83-11597
FUSION (MELTING)
 Fossil-energy [DE82-018269] p 86 N83-10570
 Ashing properties of coal blends p 86 N83-10572
FUSION REACTORS
 Sausage instability of Z-discharged plasma channel in LIB-fusion device [IPPJ-602] p 123 N83-10917
 US-Japan Workshop on Burning Plasma Physics and Engineering [IPPJ-599] p 124 N83-10921
 Special-purpose materials for magnetically confined fusion reactors [DE82-005310] p 134 N83-13974
 Feasibility study of a fission-suppressed tandem-mirror hybrid reactor [DE82-019375] p 134 N83-13997
 Advanced fuel concepts and applications [DE82-002710] p 137 N83-15110
 Proceedings of International Topical Meeting on ICF Research by Light-Ion Beam [IPPJ-611] p 138 N83-15126
 Fusion materials Adapting to realistic reactor environments [DE82-002708] p 138 N83-15132
 Designs of tandem-mirror fusion reactors [DE82-000845] p 138 N83-15134
 Conceptual design for a modular-stellarator fusion-reactor magnet [DE82-002883] p 138 N83-15135
 Magnet and conductor developments for the mirror fusion program [DE82-001062] p 139 N83-15136

GALLIUM

- Eleventh Czechoslovak Seminar on Plasma Physics and Technology
[IPPCZ-244] p 150 N83-16114
Tokamak research in the Soviet Union p 150 N83-16115
ELMO Bumpy Torus fusion-reactor design study
[DE82-002388] p 154 N83-16218
Prospects of low-activation fusion-reactor design
[DE82-003198] p 155 N83-16231
CAMAC based inter-computer communications system
[DE82-002879] p 156 N83-16233

G

GALLIUM

- Defect behavior in electron-irradiated boron- and gallium-doped silicon p 70 N83-15823
Cold crucible Czochralski for solar cells p 70 N83-15824

GALLIUM ARSENIDES

- A study of silicon and GaAs solar cells, and their optical coupling by means of a dichroic mirror — French thesis p 23 A83-11764
Design of a 13% efficient n-GaAs/1-x/P/x/semiconductor-liquid junction solar cell p 36 A83-17801
Efficiency-improvement study for GaAs solar cells
[DE82-016410] p 48 N83-11585
Air Force development of thin GaAs solar cells p 69 N83-15816
Progress toward thin-film GaAs solar cells using a single-crystal Si substrate with a Ge interlayer p 69 N83-15817
Diffused P+-N solar cells in bulk GaAs p 69 N83-15818
Advances in large-diameter liquid encapsulated Czochralski GaAs p 70 N83-15819
GaAs solar cells for concentrator systems in space p 70 N83-15820
The effect of different solar simulators on the measurement of short-circuit current temperature coefficients p 70 N83-15821
Radiation damage and annealing in large area n+/p/p+ GaAs shallow homojunction solar cells p 71 N83-15826
Basis for equivalent fluence concept in space solar cells p 71 N83-15827
Grown-in defects and defects produced by 1-Me electron irradiated in AlO₃Ga_{0.7}As P-N junction solar cells p 71 N83-15828
Progress in developing high performance solar blankets and arrays p 71 N83-15829
GaAs solar cells p 72 N83-15836
Radiation damage p 72 N83-15837
Blanket technology p 72 N83-15838
GALLIUM PHOSPHIDES
Design of a 13% efficient n-GaAs/1-x/P/x/semiconductor-liquid junction solar cell p 36 A83-17801

GAMMA RAYS

- ORNL integral experiment to provide data for evaluating magnetic-fusion-energy shielding concepts Part 1
Attenuation measurements
[DE82-019775] p 135 N83-13999

GAS ANALYSIS

- A thermal desorption cold-trap unit for gas chromatographic analysis of gaseous organic pollutants
[PB82-206368] p 3 N83-10152
Computerized, remote monitoring systems for underground coal mines Fires and explosive atmospheres
[PB82-221359] p 3 N83-10481

GAS CHROMATOGRAPHY

- A thermal desorption cold-trap unit for gas chromatographic analysis of gaseous organic pollutants
[PB82-206368] p 3 N83-10152
Development of a polysilicon process based on chemical vapor deposition, phase 1
[NASA-CR-169633] p 59 N83-14673

GAS COOLED REACTORS

- Gas cooled reactors for large space power needs p 142 N83-15858
Compact, high-power nuclear reactor systems based on small diameter particulate fuel p 143 N83-15859

GAS DETECTORS

- A thermal desorption cold-trap unit for gas chromatographic analysis of gaseous organic pollutants
[PB82-206368] p 3 N83-10152
Soft X-ray diagnostics on Tokamak TM-1-MH p 151 N83-16121

GAS DYNAMICS

- Computational model of a diffuse discharge on electrodes in a weakly ionized plasma p 114 A83-11952
Experiments on the ADAM 1 plant for the optimization of methanization process in the long distance nuclear energy transmission system test run performed in the spring of 1980
[BLL-T5689/BG/MRS14614/82] p 85 N83-10495

GAS FLOW

- Measurements of energy distribution and thrust for microwave plasma coupling of electrical energy to hydrogen for propulsion
[AIAA PAPER 82-1951] p 75 A83-12508
Transient flow analysis of the AEDC/HPDE MHD generator
[AIAA PAPER 83-0395] p 117 A83-16691
An oxygen flow calorimeter for determining the heating value of kilogram size samples of municipal solid waste p 87 N83-10580
An efficient fully implicit simulator
[CSS-126] p 109 N83-15322

GAS LASERS

- Status, research requirements and potential applications for nuclear pumped lasers p 143 N83-15862

GAS MIXTURES

- Computer simulation and molecular theory studies of natural gas mixtures
[PB82-22060] p 92 N83-11349

GAS PRESSURE

- Sources of pressure in lithium thionyl chloride batteries p 160 A83-12054

GAS RECOVERY

- Demonstration of landfill gas enhancement techniques in landfill simulators p 88 N83-10594
Research, development and demonstration in the design of sanitary landfill to optimize the generation and capture of compressible gas p 89 N83-10595
Landfill gas recovery: An analysis of results p 89 N83-10596
The development of a geopressured energy management information system in support of research planning, phase 1
[PB82-207366] p 91 N83-10638
Hydrogen recovery from supplemented natural gas by metal hydrides
[DE82-002245] p 76 N83-14303

GAS TURBINE ENGINES

- The theory of aircraft engines — Russian book p 113 A83-10675
Design of a low emission combustor for an automotive gas turbine
[AIAA PAPER 83-0338] p 117 A83-16664
Multifuel evaluation of nch/quench/lean combustor
[NASA-TM-82986] p 86 N83-10559
Cold-air performance of compressor-drive turbine of Department of Energy upgraded automobile gas turbine engine 2 Stage performance
[NASA-TM-82818] p 127 N83-11063
Propulsion and energetics panel, working group 13 on alternative jet engine fuels Volume 1 Executive summary
[AGARD-AR-181-VOL-1] p 92 N83-11350
Propulsion and energetics panel, working group 13 on alternative jet engine fuels Volume 2 Main report
[AGARD-AR-181-VOL-2] p 92 N83-11351
Advanced Gas Turbine (AGT) powertrain system development program — automobile engines
[NASA-CR-169475] p 128 N83-12088
Advanced Gas Turbine (AGT) powertrain system development for automotive applications
[NASA-CR-165178] p 129 N83-12431
Advanced Gas Turbine (AGT) powertrain system development for automotive applications
[NASA-CR-165329] p 132 N83-13038

GAS TURBINES

- Garrett solar Brayton engine/generator status p 44 N83-10545
Combustion characteristics of hydrogen-carbon monoxide based gaseous fuels
[NASA-TM-82988] p 76 N83-10560
Development of high temperature turbine subsystem technology to a technology readiness status, phase 2
[DE82-003222] p 129 N83-12437
High-Temperature-Turbine-Technology Program Phase 2: Technology test and support studies. Turbine spool technology ng fuel-contaminant tolerance test
[DE82-020287] p 101 N83-13464

GASEOUS FUELS

- Combustion characteristics of hydrogen-carbon monoxide based gaseous fuels p 78 A83-11491
Basic Research Opportunities for Lasting Fuel Gas Supplies from Inorganic Resources Report of a Workshop College Station, 8 Jun - 14 Aug 1981
[PB82-231671] p 101 N83-13284

GASIFICATION

- Kinetics and catalysis of producing synthetic gases from biomass
[PB82-214347] p 82 N83-10156
Pressure-swinging underground gasification. Theoretical and experimental investigations of gasification, phase 2 p 89 N83-10615
Conversion of forest residues to a methane-rich gas in a high-throughput gasifier
[DE82-020289] p 102 N83-13601
SFW-Funk process for gasification of solid urban and industrial waste
[BMFT-FB-T-82-066] p 16 N83-13651
Measuring program for the R and D project on gasification of domestic and industrial wastes
[BMFT-FB-T-82-118] p 16 N83-13652
GASOLIN (FUEL)
Biomass fuels update TVAs biomass fuels program
[DE82-904990] p 89 N83-10613
Source test and evaluation report: Alcohol facility for gasohol production
[PB82-237041] p 101 N83-13280

GASOLINE

- Investigation of the performance of a Ford 4.1 L 6 cylinder SI engine operating on methanol iso-butanol gasoline fuel blends
[AD-A117746] p 84 N83-10426
NO sub x emission control for heavy duty vehicles
Toward meeting a 1986 standard
[PB82-183880] p 7 N83-10665
Assessment of current and projected future trends in light-duty-vehicle fuel switching Subtask 1
[DE82-018816] p 97 N83-12440

GEOCHEMISTRY

- Hydrogeochemical and stream-sediment reconnaissance basic data for Utica quadrangle, New York
Uranium Resource Evaluation Project
[DE82-020429] p 102 N83-13552
Hydrogeochemical and stream-sediment reconnaissance basic data for Manon, Canton, Pittsburgh and Cleveland quadrangles, Ohio, West Virginia, Pennsylvania Uranium Resource Evaluation Project
[DE82-020430] p 102 N83-13553
Hydrogeochemical and stream-sediment reconnaissance basic data for Beaumont, Lake Charles and Baton Rouge quadrangles, Texas, Louisiana. Uranium Resource Evaluation Project
[DE82-020438] p 102 N83-13554
Hydrogeochemical and stream-sediment reconnaissance basic data for Ogdensburg and Lake Champlain quadrangles, New York, Vermont. Uranium Resource Evaluation Project
[DE82-020417] p 102 N83-13557
Hydrogeochemical and stream-sediment reconnaissance basic data for Sherman, Taxarkana, El Dorado, and Greenwood quadrangles, Oklahoma, Texas, Arkansas, Mississippi
[DE82-020436] p 102 N83-13559
An integrated model for the natural flow regime in the Cerro Prieto hydrothermal system, B.C., Mexico, based upon petrological and isotope geochemical criteria
[DE82-001980] p 107 N83-14658
Geochemical studies of cores from the San Juan Basin Research Site, Grants Uranium Region, New Mexico
[DE82-004153] p 108 N83-14795

GEOGRAPHIC INFORMATION SYSTEMS

- Computer management of geologic and petroleum data at the North Dakota Geological Survey
[DE82-904385] p 103 N83-13694

GEOLOGICAL SURVEYS

- Geologic studies of geopressured and hydrogeopressured zones in Texas Test well site selection
[PB82-220542] p 94 N83-11653
Low- to moderate-temperature geothermal resource assessment for Nevada. Area specific studies, Pumpernickel Valley, Carlin and Moana
[DE82-018598] p 98 N83-12584
Hydrogeochemical and stream-sediment reconnaissance basic data for Utica quadrangle, New York. Uranium Resource Evaluation Project
[DE82-020429] p 102 N83-13552
Hydrogeochemical and stream-sediment reconnaissance basic data for Manon, Canton, Pittsburgh and Cleveland quadrangles, Ohio, West Virginia, Pennsylvania. Uranium Resource Evaluation Project
[DE82-020430] p 102 N83-13553
Hydrogeochemical and stream-sediment reconnaissance basic data for Beaumont, Lake Charles and Baton Rouge quadrangles, Texas, Louisiana. Uranium Resource Evaluation Project
[DE82-020438] p 102 N83-13554

SUBJECT INDEX

SUBJECT INDEX

Hydrogeochemical and stream-sediment reconnaissance basic data for Sherman, Taxarkana, El Dorado, and Greenwood quadrangles, Oklahoma; Texas; Arkansas, Mississippi p 102 N83-13559

GEOLOGY
Computer management of geologic and petroleum data at the North Dakota Geological Survey [DE82-904385] p 103 N83-13694

GEOMETRICAL OPTICS
Optical analysis of solar energy tubular absorbers p 25 A83-12596
Transport of solar energy with optical fibres p 29 A83-13698

GEOMORPHOLOGY
Preliminary plan for the development of geothermal energy in the town of Hawthorne, Nevada [DE82-904440] p 14 N83-13620

GEOPHYSICS
Wind power assessment along the Atlantic and Gulf Coasts of the United States p 108 N83-14816

GEOPRESSURE
Standardization of sampling and analysis of geopressured fluids Part 2 Monitoring of geopressured wells p 82 N83-10151
The development of a geopressured energy management information system in support of research planning, phase 1 [PB82-207366] p 91 N83-10638
Geologic studies of geopressured and hydrogeopressured zones in Texas Test well site selection [PB82-220542] p 94 N83-11653
Aquifer stability investigation [DE82-003831] p 166 N83-14754
Advanced concepts The second generation of compressed air-energy storage technology [DE82-003838] p 167 N83-14755

GEOTHERMAL ENERGY CONVERSION
Experimental results of a nonconventional energy conversion pilot facility-thermogravimetric system [CISE-1754] p 103 N83-13629

GEOTHERMAL ENERGY EXTRACTION
Geothermal resource development for direct heat applications The impact of regulation [PB82-208414] p 8 N83-11606

GEOTHERMAL ENERGY UTILIZATION
Feasibility study of geothermal heating, Modoc Lassen housing project [DE82-015099] p 89 N83-10611
Geothermal energy development in the United States [PB82-215146] p 6 N83-10636
Ocean thermal energy at the Johns Hopkins University Applied Physics Laboratory [PB82-215054] p 122 N83-10639
Geothermal community heating for Cape Charles, Virginia [PB82-184003] p 91 N83-10640
Geothermal energy market study on the Atlantic Coastal Plain Dover Air Force Base geothermal energy evaluation [PB82-183997] p 91 N83-10643
Basin view geothermal heating district, Klamath Falls, Oregon Conceptual design and economic-feasibility study report [DE82-015108] p 93 N83-11587
Data collection and analysis for geothermal research [PB82-185430] p 97 N83-12390
Geothermal reservoir assessment, Roosevelt Hot Springs [DE82-020632] p 97 N83-12541
Geothermal power development in Hawaii Volume 1 Review and analysis [DE82-020077] p 10 N83-12544
Guide to a geothermal heat plan A geothermal energy application, serial no 3 [DE82-020591] p 13 N83-13598
Power from the hot-dry-rock geothermal resource [DE82-000759] p 107 N83-14750

GEOTHERMAL RESOURCES
A groundwater convection model for Rio Grande rift geothermal resources p 79 A83-11831
Radar and infrared remote sensing of geothermal features at Pilgrim Springs, Alaska p 79 A83-12036
Geothermal energy market study on the Atlantic Coastal Plain. Dover Air Force Base geothermal energy evaluation [PB82-183997] p 91 N83-10643
Geothermal power development in Hawaii. Volume 1. Review and analysis [DE82-020077] p 10 N83-12544
Low- to moderate-temperature geothermal resource assessment for Nevada. Area specific studies, Pumpernickel Valley, Carlin and Moana [DE82-018598] p 98 N83-12584

Geothermal-resource survey of the Tennessee Valley Region [DE82-021951] p 98 N83-12706
An integrated model for the natural flow regime in the Cerro Prieto hydrothermal system, B C, Mexico, based upon petrological and isotope geochemical criteria [DE82-001880] p 107 N83-14658
The geothermal research program of the US Geological Survey [USGS-CIRC-862] p 112 N83-15965

GEOTHERMAL TECHNOLOGY
Development of geothermal binary-cycle working-fluid properties: Information and analysis of cycles [DE82-021542] p 102 N83-13602
Preliminary plan for the development of geothermal energy in the town of Hawthorne, Nevada [DE82-904440] p 14 N83-13620
Preliminary plan for the development of geothermal energy in the town of Gabbs, Nevada [DE82-904441] p 15 N83-13621
Corrosion tests in the Marchwood geothermal borehole [AERE-G-2225] p 112 N83-15959

GERMANIUM ALLOYS
Hydrogenated a-Si_x/Ge_{1-x} - A potential solar cell material p 34 A83-15871

GIBBS FREE ENERGY
Electrochemical determination of Gibbs energies of formation of cobalt and nickel sulfides [PB82-177304] p 119 N83-10159

GLASS
Textured solar cell covers for light weight and high performance p 66 N83-14728
Applications of a high temperature radiation resistant electrical insulation p 144 N83-15874
Coating of laser fusion targets by plasma polymerized organic thin films p 152 N83-16126

GLASS COATINGS
Development of large scale production methods for components of solar energy collection Transparent glass covers and their connection to the collector system [BMFT-FB-T-82-083] p 47 N83-10622
CMX-50 A new ultra thin solar cell cover for lightweight arrays p 66 N83-14726

GLASS FIBER REINFORCED PLASTICS
Design and fabrication of composite blades for the Mod-1 wind turbine generator [NASA-CR-167987] p 128 N83-11579

GLASS FIBERS
Feasibility study of solid surface subreflector production techniques [NASA-CR-169642] p 60 N83-14678

GOLD
Optical properties of gold-magnesia selective cermets --- for solar collectors p 33 A83-15482

GOVERNMENT/INDUSTRY RELATIONS
Sacramento Municipal Utility District 100-MW sub a photovoltaic plant p 40 N83-10513

GRAIN BOUNDARIES
Large-area silicon sheet task p 41 N83-10520
Analysis of defect structure in silicon Characterization of samples from UCP ingot 5848-13C [NASA-CR-169617] p 60 N83-14680

GRINDING (COMMINUTION)
A laboratory approach to obtain suspension combustion data for reuse derived fuels p 87 N83-10579
Pulverized coal combustion p 105 N83-14198

GROUND WATER
A groundwater convection model for Rio Grande rift geothermal resources p 79 A83-11831
Community heat-pump system, Klamath County, Oregon [DE82-015106] p 5 N83-10600
Geothermal-resource survey of the Tennessee Valley Region [DE82-021951] p 98 N83-12706
Parametric study of geohydrologic performance characteristics for nuclear-waste repositories [DE82-003145] p 17 N83-13973

GROUND WIND
Study of ground winds in Upper Volta. Economic and agronomic consequences for the Sudan-Sahel region of west Africa p 98 N83-12751

GROWTH
Beam and deposition stability in light-ion fusion targets [DE82-017768] p 134 N83-13993

GUSTS
Gust structure analysis for WECS Design and performance analysis [DE82-005321] p 137 N83-14746

HEAT PIPES

H

HALL GENERATORS

Loading schemes for a 50 MWth diagonally connected MHD generator p 113 A83-10659

HAULING

Development, construction, and experimental operation of an improved chainless haulage system for drum-shearer loaders [BMFT-FB-T-82-102] p 158 N83-10428

HAZARDS

Computerized, remote monitoring systems for underground coal mines Fires and explosive atmospheres [PB82-221359] p 3 N83-10481
Earth-covered buildings An exploratory analysis for hazard and energy performance [PB82-189564] p 10 N83-12285
A reference-maternal system for estimating health and environmental risks of selected maternal cycles and energy systems [DE82-019309] p 15 N83-13647
Emerging technologies for the control of hazardous wastes [PB82-236993] p 17 N83-13666

HEALTH

Biomedical and environmental sciences programs at the Oak Ridge National Laboratory [DE82-019897] p 13 N83-13516
A reference-maternal system for estimating health and environmental risks of selected maternal cycles and energy systems [DE82-019309] p 15 N83-13647
Health effects research in direct coal liquefaction Studies of H-coal distillates Phase 1 PDU samples, the effects of hydrotreatment [DE82-003702] p 18 N83-14302

HEAT EXCHANGERS

High-temperature ceramic heat exchanger element for a solar thermal receiver p 26 A83-13476
A study of different techniques for cooling solar cells in centralized concentrator photovoltaic power plants --- French thesis p 30 A83-14109
An experimental study and modeling of heat transfer in boilers of small and medium power --- French thesis p 80 A83-15841
High-temperature ceramic heat exchanger element for a solar thermal receiver p 44 N83-10543
Ceramic high temperature receiver design and tests p 44 N83-10544
WECS-load controlled pitch-variable load conversion to heat [DE82-014683] p 121 N83-10602
Steam gasification of coal, project prototype plant nuclear process heat. Report at the end of the reference phase [BMFT-FB-T-82-069] p 90 N83-10616
Symposia on Pulse-Combustion Applications and Condensing Heat Exchangers [PB82-184086] p 91 N83-10641
Evaluation of solar-air-heating central-receiver concepts [DE82-016924] p 48 N83-11586
Symposium on Condensing Heat Exchangers Volume 2 Proceedings [PB82-240078] p 159 N83-13311
Use of waste heat in district systems with considerations of seasonal-heat-demand variations [DE82-019923] p 14 N83-13614
A high temperature ceramic heat exchanger element for a solar thermal receiver [NASA-CR-169625] p 58 N83-14666

HEAT FLUX

Startup conditions of alkali-metal vaporization from rectangular channels --- in heat pipes p 157 A83-18446
Development of the trickle roof cooling and heating system Experimental plan [DE82-019082] p 57 N83-13615
Deuterium flux measurements in the edge plasmas of PLT and PDX during auxiliary heating experiments [DE82-001909] p 139 N83-15143

HEAT MEASUREMENT
Characterization of RDF properties through high pressure differential scanning calorimetry p 87 N83-10582

HEAT PIPES

Performance investigation of a long, slender heat pipe for thermal energy storage applications --- for solar residential heating p 159 A83-10651
The effect of the parameters of metal-fiber capillary structures on the maximum heat-transfer capability of thermal pipes p 156 A83-11515
Testing of the energy module of a parabolocylindrical solar installation p 31 A83-15130

HEAT PUMPS

- Use of thermocapillary migration in a controllable heat valve p 156 A83-16093
- Fully controllable heat pipe containing a short electro-osmotic pumping section [AIAA PAPER 83-0317] p 157 A83-16647
- Performance characteristics of the double-wall artery high capacity heat pipe [AIAA PAPER 83-0318] p 157 A83-16648
- Radiant heating tests of several liquid metal heat-pipe sandwich panels [AIAA PAPER 83-0319] p 157 A83-16649
- Startup conditions of alkali-metal vaporization from rectangular channels --- in heat pipes p 157 A83-18446
- Transient shutdown of an axial-groove liquid trap heat pipe thermal diode p 157 A83-19161
- Fabrication and development of several heat pipe honeycomb sandwich panel concepts --- airframe integrated scramjet engine [NASA-CR-165962] p 170 N83-10379
- Data collection and analysis for geothermal research [PB82-185430] p 97 N83-12390
- Heat pipe thermal switch [NASA-CASE-GSC-12812-1] p 159 N83-12525
- Aging of small cryogenic heat pipes [SABCA-JPM/LN/H05/N28] p 159 N83-13248
- Effects of reactor design, component characteristics and operating temperatures on direct conversion power systems p 142 N83-15857
- The need for improved heat pipe fluids p 159 N83-15892
- Enhanced heat pipe theory and operation p 145 N83-15893
- Liquid ribbon radiator for lightweight space radiator systems p 145 N83-15895
- ### HEAT PUMPS
- Analysis of two-phase flow solar collectors with application to heat pumps p 27 A83-13481
- The solar assisted air-source heat pump system, part 1 [PB82-218439] p 39 N83-10286
- Economic efficiency in the sizing of residential heat pumps [PB82-179029] p 3 N83-10401
- Positive displacement rotary vapor compressor for vapor compression --- for waste steam utilization [PB82-227620] p 3 N83-10429
- Application of the subatmospheric engine to solar thermal power p 45 N83-10546
- Community heat-pump system, Klamath County, Oregon [DE82-015106] p 5 N83-10600
- Diesel driven low capacity heat pump for heating and hot water production [BMFT-FB-T-82-128] p 7 N83-11592
- Northern-climate heat-pump field performance evaluation [DE82-905832] p 12 N83-13402
- Heat Storage and Heat Pumps [PB82-226481] p 163 N83-13415
- Air circuit with heat pump --- waste heat utilization in the production of paper [PB82-221219] p 18 N83-14312
- ### HEAT RADIATORS
- Effects of reactor design, component characteristics and operating temperatures on direct conversion power systems p 142 N83-15857
- Liquid ribbon radiator for lightweight space radiator systems p 145 N83-15895
- ### HEAT RESISTANT ALLOYS
- Some material implications of space nuclear reactors (non-fuel materials) p 170 N83-15870
- ### HEAT SHIELDING
- Thermal management of large pulsed power systems p 145 N83-15889
- ### HEAT SINKS
- Heat pipe thermal switch [NASA-CASE-GSC-12812-1] p 159 N83-12525
- ### HEAT SOURCES
- The solar assisted air-source heat pump system, part 1 [PB82-218439] p 39 N83-10286
- Symposium on Pulse-Combustion Applications Volume 1 Proceedings [PB82-240060] p 159 N83-13310
- Symposium on Condensing Heat Exchangers Volume 2 Proceedings [PB82-240078] p 159 N83-13311
- Assessment of alternative power sources for mobile mining machinery [NASA-TM-82695] p 136 N83-14691
- ### HEAT STORAGE
- Performance investigation of a long, slender heat pipe for thermal energy storage applications --- for solar residential heating p 159 A83-10651

- Thermal storage performance calculations by closed form and finite difference solutions [ASME PAPER 82-HT-52] p 26 A83-12799
- An experimental study of single medium thermocline thermal energy storage [ASME PAPER 82-HT-53] p 26 A83-12800
- Thermal energy storage units for solar electric power plants p 31 A83-15132
- Liquid phase thermochemical energy conversion systems - An application of Diels-Alder chemistry p 118 A83-17149
- Solar energy storage by the reversible reaction - N2O4 yields 2NO2 - Theoretical and experimental results p 37 A83-18554
- The effect of crystal size on the thermal energy storage capacity of thickened Glauber's salt p 160 A83-18562
- Investigation of heat storage for temperature range from 200 to 500 C [BMFT-FB-T-82-105] p 161 N83-10627
- The prediction of the thermal performance of building by the CR-method --- heat storage and transmission [CSIR-BRR-396] p 161 N83-11578
- Thermochemical heat storage State-of-the-art report [PB82-188087] p 162 N83-11610
- Heat Storage and Heat Pumps [PB82-226481] p 163 N83-13415
- Optimal sizing of heating systems that store and use thermal energy [DE82-003011] p 164 N83-13609
- Seasonal thermal storage Swedish practice, developments and cost projections [PB82-232331] p 165 N83-13635
- Industrial thermal energy storage What are the possibilities? [DE82-001494] p 166 N83-14748
- The ORNL Thermal Energy Storage Program Technical support [DE81-030805] p 168 N83-15943
- The ORNL Thermal Energy Storage Program [DE81-032001] p 168 N83-15944
- Advanced high-temperature thermal energy storage media for industrial applications [DE82-000161] p 168 N83-15945
- Performance of labyrinth-stratified water-storage system for heating and cooling [DE82-000107] p 168 N83-15946
- Evaluation of olivine ceramic refractories for thermal-energy-storage application [DE82-000108] p 168 N83-15947
- Thermal energy storage testing facilities [DE82-000110] p 168 N83-15948
- Field evaluation and assessment of thermal energy storage for residential space heating [DE82-000164] p 168 N83-15949
- Mathematical modeling of TES subsystems [DE82-000168] p 168 N83-15950
- Once-through heat transport and seasonal storage for city of Bellingham [DE82-001501] p 169 N83-15956
- Survey of utility load management projects Third revised report [DE82-000888] p 169 N83-15957
- ### HEAT TOLERANCE
- Advanced regenerative heat recovery system [PB82-200650] p 8 N83-11604
- ### HEAT TRANSFER
- The effect of the parameters of metal-fiber capillary structures on the maximum heat-transfer capability of thermal pipes p 156 A83-11515
- Collection of solar energy at specified output temperature p 28 A83-13582
- An experimental study and modeling of heat transfer in boilers of small and medium power --- French thesis p 80 A83-15841
- Performance characteristics of the double-wall artery high capacity heat pipe [AIAA PAPER 83-0318] p 157 A83-16648
- Heat transfer - A review of 1981 literature p 169 A83-17701
- Heat Transfer and Fluid Mechanics Institute, Meeting, 28th, California State University, Sacramento, CA, June 28, 29, 1982, Proceedings p 37 A83-18451
- An analytical investigation of mass flow, pressure and temperature in a flat-plate solar collector p 37 A83-18452
- High-temperature ceramic heat exchanger element for a solar thermal receiver p 44 N83-10543
- NECAP 4-1: NASA's Energy Cost Analysis Program thermal response factor routine [NASA-CR-165982] p 4 N83-10562
- Assessment of high heat-transfer evaporators as power plant condensers to produce abundant freshwater [PB82-198045] p 7 N83-11277
- Frictional characteristics and heat transfer of antimisting fuels in tubes [NASA-CR-169388] p 96 N83-12248

- Gasification kinetics for biomass decomposition [PB82-199043] p 97 N83-12256
- Development of enhanced heat transfer/transport/storage sturnes for thermal-system improvement [DE82-021236] p 158 N83-12387
- Superior heat-transfer fluids for solar heating and cooling applications Results of acute oral-toxicity determinations [DE82-002758] p 52 N83-12560
- Scale effects in liquefied fuel vapor dispersion [DE82-006198] p 11 N83-12659
- An assessment of gas-side fouling in cement plants [NASA-CR-169513] p 15 N83-13644
- ### HEAT TRANSMISSION
- Determination of friction coefficients on several distant heat pipe sections with different sliding partners --- static friction measurement of flat bearings [BMFT-FB-T-82-095] p 158 N83-10397
- Heat transparent high intensity high efficiency solar cell [NASA-CASE-LEW-12892-1] p 61 N83-14692
- ### HEAT TREATMENT
- Transport mechanisms for Mg/Zn3P2 junctions p 35 A83-16071
- Heat-treatment studies on thin-film CdS/Cu_x/S solar cells p 35 A83-16084
- ### HEATING
- Analysis of thermal comfort in a passive solar heated residence [PB82-180142] p 39 N83-10297
- Configuration selection study for isolated loads using parabolic dish modules p 45 N83-10548
- Intermediate photovoltaic system application experiment operational performance report. Volume 7 Beverly High School, Beverly, Mass [DE82-015790] p 46 N83-10607
- Prototype solar house Study of the scientific evaluation and feasibility of a research and development project [BMFT-FB-T-82-137] p 49 N83-11598
- Geothermal resource development for direct heat applications The impact of regulation [PB82-208414] p 8 N83-11606
- Comments on thermal runaway experiments in sub-ignition Tokamaks [IPPJ-610] p 131 N83-12997
- Lower-hybrid-heating experiments on the Alcator C and the Versator II Tokamaks [DE82-013674] p 132 N83-13007
- Preliminary plan for the development of geothermal energy in the town of Hawthorne, Nevada [DE82-904440] p 14 N83-13620
- Preliminary plan for the development of geothermal energy in the town of Gabbs, Nevada [DE82-904441] p 15 N83-13621
- Reaction-induced temperature deviations during coal devolatilization in a heated grid [DE82-003864] p 106 N83-14300
- Deuterium flux measurements in the edge plasmas of PLT and PDX during auxiliary heating experiments [DE82-001909] p 139 N83-15143
- Once-through heat transport and seasonal storage for city of Bellingham [DE82-001501] p 169 N83-15956
- ### HEATING EQUIPMENT
- The solar assisted air-source heat pump system, part 1 [PB82-218439] p 39 N83-10286
- Advanced regenerative heat recovery system [PB82-200650] p 8 N83-11604
- Symposium on Pulse-Combustion Applications Volume 1 Proceedings [PB82-240060] p 159 N83-13310
- Thermal analysis of the position of the freezing front around an LNG in-ground storage tank with a heat barrier p 110 N83-15712
- ### HEAVY IONS
- Accelerator and fusion research division [DE82-012381] p 124 N83-10930
- ### HELICOPTER CONTROL
- Attempt to determine the power demand of a helicopter control system on the basis of flight tests p 1 A83-10439
- ### HELICOPTER WAKES
- Momentum theory, dynamic inflow, and the vortex-ring state p 116 A83-16026
- ### HELIOS 1
- Preliminary results of Helios solar generator inflight performance evaluation p 64 N83-14716
- ### HELIOSTATS
- A methodology of evaluation and design of fields of focusing heliostats --- French thesis p 24 A83-11768
- Determination of the interference between the elements of a central-receiver solar system p 24 A83-11848

SUBJECT INDEX

SUBJECT INDEX

- Automatic methods for the adjustment of faceted solar-energy concentrators and heliostats p 31 A83-15131
- Investigation of the equations of motion of the heliostats of a tower-type solar electric power plant p 31 A83-15133
- Prospects for the construction of solar furnaces for industry p 38 A83-19238
- HELITRONS**
- Parametric systems analysis of the Modular Stellarator Reactor (MSR) [DE82-016244] p 126 A83-10945
- HELIUM PLASMA**
- Helium population model p 154 A83-18139
- HETEROJUNCTION DEVICES**
- Valency control of glow discharge produced a-SiC:H and its application to heterojunction solar cells p 28 A83-13649
- A p-n heterojunction model for the thin-film CuInSe₂/CdS solar cell p 30 A83-14513
- Transport mechanisms for Mg/Zn₃P₂ junctions p 35 A83-16071
- Photovoltaic properties of cadmium sulfide/trivalent-metal phthalocyanine heterojunction devices p 39 A83-19259
- HIGH ALTITUDE BALLOONS**
- Transformation of wind energy by a high-altitude power plant p 117 A83-18112
- HIGH CURRENT**
- Pulsed power for inertial-confinement fusion [DE82-001991] p 137 A83-15118
- HIGH FIELD MAGNETS**
- Performance results of a 300 MWth generator at high magnetic field [AIAA PAPER 83-0394] p 117 A83-16690
- HIGH FREQUENCIES**
- Lower-hybrid-heating experiments on the Alcator C and the Versator II Tokamaks [DE82-013674] p 132 A83-13007
- HIGH PRESSURE**
- Measurement of high-temperature high-pressure processes. A summary report [PB82-196932] p 98 A83-12667
- HIGH STRENGTH STEELS**
- Stress-corrosion studies in coal-liquefaction environments [DE82-001464] p 100 A83-13240
- HIGH TEMPERATURE**
- High-temperature ceramic heat exchanger element for a solar thermal receiver p 26 A83-13478
- Experiments on the ADAM 1 plant for the optimization of methanization process in the long distance nuclear energy transmission system test run performed in the spring of 1980 [BLT-75869/BG/MRS14614/82] p 85 A83-10495
- High-temperature ceramic heat exchanger element for a solar thermal receiver p 44 A83-10543
- Ceramic high temperature receiver design and tests p 44 A83-10544
- Investigation of heat storage for temperature range from 200 to 500 C [BMFT-FB-T-82-105] p 181 A83-10627
- Measurement of high-temperature high-pressure processes. A summary report [PB82-196932] p 98 A83-12667
- Applications of a high temperature radiation resistant electrical insulation p 144 A83-15874
- HIGH TEMPERATURE AIR**
- An experimental study of fuel combustion in a high-temperature air counterflow p 79 A83-14056
- Air circuit with heat pump — waste heat utilization in the production of paper [PB82-221219] p 18 A83-14312
- HIGH TEMPERATURE ENVIRONMENTS**
- Spectral selectivity of high-temperature solar absorbers II Effects of interference p 33 A83-15488
- HIGH TEMPERATURE GASES**
- Development of high temperature turbine subsystem technology to a technology readiness status, phase 2 [DE82-003222] p 129 A83-12437
- HIGH TEMPERATURE TESTS**
- Reflections on solar collectors at elevated temperatures /260-1000 C/ — French thesis p 23 A83-11766
- HIGH VOLTAGES**
- Planar multijunction high voltage solar cell chip p 30 A83-13923
- Fundamental research into high voltages for further development of electric power distribution systems [BMFT-FB-T-82-064] p 157 A83-10368
- HIGHWAYS**
- Status of alcohol-fuels-utilization technology for highway transportation. A 1981 perspective. Volume 1. Spark-ignition engines [DE82-020493] p 96 A83-12255

- Application of fuel cells to highway and nonhighway transportation [DE82-004365] p 156 A83-16259
- HISTORIES**
- The geothermal research program of the US Geological survey [USGS-CIRC-862] p 112 A83-15965
- HONEYCOMB STRUCTURES**
- Fabrication and development of several heat pipe honeycomb sandwich panel concepts — airframe integrated scramjet engine [NASA-CR-165962] p 170 A83-10379
- HORIZONTAL ORIENTATION**
- A review of resonance response in large, horizontal-axis wind turbines p 114 A83-13696
- An experimental study of an aerodynamically optimum windmill [NAL-TR-698] p 129 A83-12522
- Horizontal and vertical axis wind turbines p 130 A83-12529
- Aerodynamic analysis of horizontal axis wind turbines p 130 A83-12530
- Control systems for horizontal-axis wind turbines p 130 A83-12532
- Static and dynamic analysis for hinged rotor blades of 60 m span for a two bladed horizontal axis wind energy converter p 130 A83-12535
- Optimization of the dynamic inducer wind turbine system p 150 A83-15940
- HOT ELECTRONS**
- Hot-electron luminescence in aged electrodeposited CdSe liquid-junction solar cell p 36 A83-16946
- HYBRID STRUCTURES**
- Lower-hybrid-heating experiments on the Alcator C and the Versator II Tokamaks [DE82-013674] p 132 A83-13007
- Global model of a hybrid Tokamak reactor with an auxiliary RF heating p 153 A83-18137
- HYDRATES**
- Methane hydrate gas production Evaluating and exploiting the solid gas resource [DE82-004373] p 110 A83-15498
- HYDRAULIC EQUIPMENT**
- Conceptual design and cost analysis of hydraulic output unit for 15 kW free-piston Stirling engine [NASA-CR-165543] p 121 A83-10561
- A conceptual study of the potential for automotive-derived and free-piston Stirling engines in 30- to 400-kilowatt stationary power applications [NASA-CR-165274] p 121 A83-10568
- Development of new and improvement of existing core recovery methods [BMFT-FB-T-82-091] p 91 A83-10705
- Break-in, performance and endurance tests results on fixed displacement hydraulic fluid power vane pumps [AD-A117962] p 128 A83-11504
- Modular small hydro configuration [PB82-184953] p 129 A83-12327
- Gas-to-hydraulic power converter [NASA-CASE-MSC-18794-1] p 136 A83-14693
- HYDROCARBON COMBUSTION**
- An experimental study of fuel combustion in a high-temperature air counterflow p 79 A83-14056
- HYDROCARBON FUEL PRODUCTION**
- Water hyacinth wastewater treatment system p 88 A83-10586
- Conversion of forest residues to a methane-rich gas in a high-throughput gasifier [DE82-020289] p 102 A83-13601
- HYDROCARBON FUELS**
- Developing technologies for synthetic fuels p 78 A83-10658
- A carbon-13 and proton nuclear magnetic resonance study of some experimental referee broadened-specification /ERBS/ turbine fuels p 78 A83-11482
- Catalytic autothermal reforming increases fuel cell flexibility p 74 A83-11794
- Recent trends in aviation turbine fuel properties [NASA-TP-2056] p 92 A83-11340
- Characterization of diesel emissions from operation of a light-duty diesel vehicle on alternate source diesel fuels [PB82-234147] p 101 A83-13282
- HYDROCARBONS**
- Analytical techniques for aromatic components in aircraft fuels [AD-A118838] p 96 A83-12252
- Background levels and environmental cycling of petroleum hydrocarbons: Multimedia monitoring requirements p 11 A83-12630
- HYDROCRACKING**
- Role of tin catalysts in the hydroliquefaction of coal — hydrocracking p 81 A83-10131

HYDROGENATION

- HYDROELECTRIC POWER STATIONS**
- Ice distribution and winter surface circulation patterns, Kachemak Bay, Alaska p 1 A83-12038
- Seminar on Accelerated Hydroelectric Development in India. Proceedings, volume 1 [PB82-217753] p 122 A83-10634
- Seminar on Accelerated Hydroelectric Development in India. Post session proceedings, volume 2 [PB82-217761] p 122 A83-10635
- Modular small hydro configuration [PB82-184953] p 129 A83-12327
- Climatic aspects of planning impoundments and hydropower operations p 99 A83-12754
- Preliminary design study of underground pumped hydro and compressed-air energy storage in hard rock. Volume 8. Design approaches - UPH. Appendix B: Shafts [DE81-028202] p 164 A83-13607
- Status of the 4 MW WTS-4 wind turbine p 148 A83-15921
- HYDROGEN**
- Cell and module formation research area p 41 A83-10522
- Combustion characteristics of hydrogen Carbon monoxide based gaseous fuels [NASA-TM-82998] p 76 A83-10560
- Photosynthetic water splitting [PB82-200684] p 76 A83-12206
- Hydrogen recovery from supplemented natural gas by metal hydrides [DE82-002245] p 76 A83-14303
- Use of oxide decompositions in advanced thermochemical hydrogen cycles for solar heat sources. Experimental results on the low-temperature reactions for the tricobalt tetraoxide-cobalt monoxide pair [DE82-002390] p 77 A83-15958
- HYDROGEN FUELS**
- Combustion characteristics of hydrogen-carbon monoxide based gaseous fuels p 78 A83-11491
- Metallurgy of rechargeable hydrides p 160 A83-11509
- Particle size distribution of Ni microprecipitates in LaNi₅ used for hydrogen storage p 75 A83-12295
- Measurements of energy distribution and thrust for microwave plasma coupling of electrical energy to hydrogen for propulsion [AIAA PAPER 82-1951] p 75 A83-12508
- Summary of DOE Hydrogen Program FY-1981 by the Hydrogen Energy Coordinating Committee [DE82-020494] p 76 A83-13276
- HYDROGEN PLASMA**
- Diagnostics of nonequilibrium hydrogen plasma p 153 A83-18135
- HYDROGEN PRODUCTION**
- Catalytic autothermal reforming increases fuel cell flexibility p 74 A83-11794
- Operation of a steady-state pH-differential water electrolysis cell p 75 A83-16041
- Production of hydrogen by direct thermal decomposition of water - Preliminary investigations p 75 A83-16042
- Hydrogen as a vector for central receiver solar utilities p 75 A83-16044
- Advanced alkaline electrolysis cell development. Development of electrolysis operation cell separator for 1250C [DE82-020697] p 76 A83-13593
- HYDROGEN RECOMBINATIONS**
- Deep discharge reconditioning and shorted storage of batteries — nickel cadmium batteries [NASA-CR-167953] p 120 A83-10502
- HYDROGEN SULFIDE**
- Determination of a range of concern for mobile source emissions of hydrogen sulfide [PB82-201773] p 6 A83-10663
- HYDROGEN-BASED ENERGY**
- Metallurgy of rechargeable hydrides p 160 A83-11509
- HYDROGENATION**
- Hydrogenated a-Si₃N₄/Ga₂S₃ - A potential solar cell material p 34 A83-15871
- Effect of hydrogen on the deposition rate for planar RF magnetron sputtering of hydrogenated amorphous silicon p 35 A83-16082
- Phototype plant for Nuclear Process Heat (NPH), reference phase. R and D work on Hydrogenated Coal Gasification (HCG) Further operation of semi-industrial plant for hydrogenated coal gasification [BMFT-FB-T-82-098] p 90 A83-10625
- Investigation of the hydrochlorination of SC4 [NASA-CR-169621] p 58 A83-14668
- Investigation of the hydrochlorination of SiCl₄ [NASA-CR-169622] p 60 A83-14682

HYDROGEOLOGY

HYDROGEOLOGY

- Hydrogeochemical and stream-sediment reconnaissance basic data for Ogdensburg and Lake Champlain quadrangles, New York, Vermont. Uranium Resource Evaluation Project [DE82-020417] p 102 N83-13557
- Parametric study of geohydrologic performance characteristics for nuclear-waste repositories [DE82-003145] p 17 N83-13973

HYDROLOGY

- Climatic aspects of planning impoundments and hydropower operations p 99 N83-12754

HYDROLYSIS

- The Tennessee Valley Authority's biomass fuels program [DE81-904161] p 109 N83-15495

HYDROLYSIS

- Flash hydrolysis of coal for conversion to liquid and gaseous fuels [DE82-019435] p 100 N83-13197

HYDROSTATICS

- The use of buoyancy to lift heavy objects from the sea [AD-A118320] p 106 N83-14306

HYDROTHERMAL SYSTEMS

- Analytical model for interim expansion of electrical energy generating systems [INPE-2558-TDL/104] p 129 N83-12520
- An integrated model for the natural flow regime in the Cerro Prieto hydrothermal system, B.C., Mexico, based upon petrological and isotope geochemical criteria [DE82-001980] p 107 N83-14658
- Use of wireline logs at Cerro Prieto in identification of the distribution of hydrothermally altered zones and dike locations and their correlation with reservoir temperatures [DE82-001981] p 107 N83-14661
- The geothermal research program of the US Geological Survey [USGS-CIRC-862] p 112 N83-15965

BEAMS

- Study of ion beam-initiated inertial-confinement fusion [DE82-013935] p 124 N83-10931

ICE FORMATION

- Ice distribution and winter surface circulation patterns, Kachemak Bay, Alaska p 1 A83-12038

IGNITION

- Particulate processes in pulverized coal flames [DE82-003370] p 76 N83-14204

IGNITION SYSTEMS

- Evaluation of plasma jet ignition for improved performance of alternate fuels [AD-A120160] p 112 N83-16212

ILLUMINATING

- Operational considerations on the moon-day project p 38 A83-19148
- Preliminary analysis of wave energy conversion at an offshore structure [AD-A120079] p 146 N83-15903

IMAGE FURNACES

- Thermal response of solar receiver aperture plates during sun walk-off [ASME PAPER 82-HT-33] p 25 A83-12791

IMAGE PROCESSING

- Digital image transmission and coding p 127 N83-11397

IMAGING TECHNIQUES

- Microstructure of coal p 87 N83-10576

IMPROVEMENTS

- Analysis of target implosion irradiated by proton beam 1 Beam interaction with target plasma [IPJ-612] p 134 N83-13989

IMPURITIES

- Role of impurities in silicon solar cell performance p 32 A83-15457
- Dry processing of power plant coal rich in inerts --- use of air classifier for dry upgrading of coal with high inerts content [BMFT-FB-T-82-101] p 90 N83-10631
- Second-cyclotron-harmonic emission measurements on ISX-B [DE82-009938] p 126 N83-10949
- Review of plasma-impurity sources during Tokamak operation [DE82-017098] p 126 N83-10951
- Advanced Czochralski silicon growth technology for photovoltaic modules [NASA-CR-169661] p 61 N83-14685
- Tritium waste control October 1980 - March 1981 [DE82-002088] p 20 N83-14774
- Deep impurity trapping concepts for power semiconductor devices p 170 N83-15877

INCIDENT RADIATION

- Optical analysis of solar energy tubular absorbers p 25 A83-12596
- Incident angle modifiers for flat-plate solar collectors - Analysis of measurement and calculation procedures p 27 A83-13480
- Spectral selectivity of high-temperature solar absorbers II Effects of interference p 33 A83-15488

INCINERATORS

- Energy recovery and cogeneration from an existing municipal incinerator p 5 N83-10589
- Conversion of municipal solid waste to energy, Jacksonville, Florida p 5 N83-10593

INDEXES (DOCUMENTATION)

- Electric-utility solar-energy activities 1981 survey [DE82-905804] p 57 N83-13623
- Publications of the Jet Propulsion Laboratory, 1981 [NASA-CR-169519] p 170 N83-14016

INDIA

- Estimation of wave power potential along the Indian coastline p 80 A83-17849
- Seminar on Accelerated Hydroelectric Development in India Proceedings, volume 1 [PB82-217753] p 122 N83-10634
- Seminar on Accelerated Hydroelectric Development in India Post session proceedings, volume 2 [PB82-217761] p 122 N83-10635

INDIUM ANTIMONIDES

- Direct-gap group IV semiconductors based on tin p 22 A83-10294

INDOOR AIR POLLUTION

- Conserving energy by improving the quality of the air purifying and air conditioning systems [BMFT-FB-T-82-067] p 6 N83-10651

INDUCTANCE

- Inductive energy stores [AD-A118337] p 162 N83-11582

INDUCTION HEATING

- Inductive energy stores [AD-A118337] p 162 N83-11582

INDUCTION MOTORS

- Improved transistorized AC motor controller for battery powered urban electric passenger vehicles [NASA-CR-167978] p 120 N83-10349

INDUSTRIAL ENERGY

- Thermal infrared sensing applied to energy conservation in building envelopes /Thermosense IV/, Proceedings of the Meeting, Ottawa, Ontario, Canada, September 1-4, 1981 p 2 A83-12686
- Prospects for the construction of solar furnaces for industry p 38 A83-19236
- Determination of friction coefficients on several distant heat pipe sections with different sliding partners --- static friction measurement of flat bearings [BMFT-FB-T-82-095] p 158 N83-10397
- A 400-kWe high-efficiency steam turbine for industrial cogeneration p 43 N83-10537
- Urban waste as a potential source for brick plants p 88 N83-10591
- Absorption type water chiller fired directly by waste heat [BMFT-FB-T-82-129] p 7 N83-11593
- Utilization of the waste heat of a steel work [BMFT-FB-T-82-135] p 8 N83-11597
- Advanced regenerative heat recovery system [PB82-200650] p 8 N83-11604
- Harnessing the Sun for development. Actions for consideration by the international community at the UN Conference on New and Renewable Sources of Energy for promoting the use of renewable energy in developing countries [DE82-020273] p 52 N83-12558
- Industrial energy use, annual report for 1979 - 1980 [PB82-200585] p 11 N83-12590
- Industrial energy use, volume 2 [PB82-200593] p 11 N83-12593
- Demonstration of synergistic industrial energy/municipal solid waste disposal facility [DE82-001145] p 99 N83-13041
- Guide to a geothermal heat plan A geothermal energy application, serial no 3 [DE82-020591] p 13 N83-13598
- An overview of Solar Industrial Process-Heat (SIPH) applications below 120 deg C [DE82-021360] p 57 N83-13603
- An assessment of the industrial energy conservation program, volume 2 [PB82-225780] p 15 N83-13630
- Air circuit with heat pump --- waste heat utilization in the production of paper [PB82-221219] p 18 N83-14312
- Industrial thermal energy storage What are the possibilities? - [DE82-001494] p 166 N83-14748

- The worldwide market for photovoltaics in the rural sector [NASA-TM-83035] p 73 N83-15840

INDUSTRIAL MANAGEMENT

- Photovoltaic research needs industry perspective p 40 N83-10516

INDUSTRIAL PLANTS

- Compilation of air pollutant emission factors, supplement 12 [PB82-184722] p 6 N83-10654
- The joint Australia/Federal Republic of Germany feasibility study on the conversion of Australian coals into liquid fuels in Australia [BMFT-FB-T-82-133] p 94 N83-11595
- Great Plains Gasification Project [DE82-019500] p 103 N83-13605
- Total energy food plant 21 million gallon ethanol facility [DE82-019258] p 14 N83-13617
- An assessment of gas-side fouling in cement plants [NASA-CR-169513] p 15 N83-13644

INDUSTRIAL WASTES

- Utilization of ANCIT plant by-products [BMFT-FB-T-82-144] p 94 N83-11600
- Advanced regenerative heat recovery system [PB82-200650] p 8 N83-11604
- SFW-Funk process for gasification of solid urban and industrial waste [BMFT-FB-T-82-117] p 16 N83-13651
- Measuring program for the R and D project on gasification of domestic and industrial wastes [BMFT-FB-T-82-118] p 16 N83-13652
- Nuclear and coal waste disposal hampered by legal, regulatory and technical uncertainties [EMD-82-63] p 19 N83-14770

INDUSTRIES

- Panel discussions Industrial support sector requirements p 4 N83-10550

INELASTIC SCATTERING

- The Doublet III Thomson-scattering-system hemiconcentric triplet lens [DE82-017384] p 123 N83-10908

INERTIAL CONFINEMENT FUSION

- Sausage instability of Z-discharged plasma channel in LIB-fusion device [IPJ-602] p 123 N83-10917
- Accelerator and fusion research division [DE82-012361] p 124 N83-10930
- Beam and deposition stability in light-ion fusion targets [DE82-017768] p 134 N83-13993
- Pulsed power for inertial-confinement fusion [DE82-001991] p 137 N83-15116
- Transport of light-ion beams in plasma channels [DE82-001649] p 139 N83-15140
- Fusion at counterstreaming ion beams Ions Optic Fusion (IOF) p 151 N83-16124
- Dynamics of ionization and transport in a magnetically confined plasma column p 153 N83-16132

INERTIAL FUSION (REACTOR)

- Heavy-ion inertial fusion Initial survey of target gain versus ion-beam parameters [DE82-003069] p 138 N83-15117

INFORMATION DISSEMINATION

- A compendium of synfuel end use testing programs [PB82-236936] p 100 N83-13279

INFORMATION MANAGEMENT

- Emerging technologies for the control of hazardous wastes [PB82-236993] p 17 N83-13666

INFORMATION SYSTEMS

- The development of a geopressed energy management information system in support of research planning, phase 1 [PB82-207366] p 91 N83-10638

INFRARED IMAGERY

- Radar and infrared remote sensing of geothermal features at Pilgrim Springs, Alaska p 79 A83-12036
- Thermal infrared sensing applied to energy conservation in building envelopes /Thermosense IV/, Proceedings of the Meeting, Ottawa, Ontario, Canada, September 1-4, 1981 p 2 A83-12686
- Environmental monitoring of the Athabasca Oil Sands Region p 80 A83-14238

INFRARED LASERS

- Laser-isotope-separation technology [DE81-030114] p 104 N83-14197

INFRARED RADIATION

- Large infrared test rig for vacuum temperature cycling tests in the ESTEC DTC p 65 N83-14720
- Direct conversion of infrared radiant energy for space power applications p 73 N83-15865

INFRARED SPECTRA

- Spectroscopic studies of the hazards of Li/SOCl₂ batteries during anode-limited cell reversal p 114 A83-12056

SUBJECT INDEX

KEROSENE

INFRARED TRACKING

Cryo-cooler development for space flight applications
p 114 A83-13480

INGOTS

Advanced Czochralski ingot growth
p 40 N83-10509
Price estimates for the production of wafers from silicon
ingots
[NASA-CR-169517] p 55 N83-13583

INLET FLOW

Inflow disk generator for open-cycle MHD power
generation p 116 A83-16104

INLET TEMPERATURE

Cold-air performance of compressor-drive turbine of
Department of Energy upgraded automobile gas turbine
engine 2- Stage performance
[NASA-TM-82818] p 127 N83-11063

INORGANIC COMPOUNDS

Basic Research Opportunities for Lasting Fuel Gas
Supplies from Inorganic Resources Report of a Workshop
College Station, 8 Jun - 14 Aug. 1981
[PB82-231671] p 101 N83-13284

INPUT

NECAP 4.1 NASA's Energy-Cost Analysis Program last
input manual and example
[NASA-TM-83241] p 4 N83-10566

ISOLATION

Effect of off-south orientation on the performance of
collector reflector system in India p 30 A83-14671
Intermediate photovoltaic system application experiment
operational performance report. Volume 7 Beverly High
School, Beverly, Mass
[DE82-015790] p 46 N83-10607
Data report for the Northeast Residential Experiment
Station, Apr 1982
[DE82-021954] p 53 N83-12569
Intermediate photovoltaic system application experiment
operational performance report for CDC Light
Manufacturing Building, San Bernardino, California
[DE82-020883] p 56 N83-13599

INSTRUMENT ERRORS

General contamination criteria for optical surfaces ---
instrument performance losses in spaceborne conditions
p 29 A83-13743

INSTRUMENT LANDING SYSTEMS

Instrument landing system localizer receiver
performance in the presence of co-channel interference
[AD-A118909] p 89 N83-13089

INSTRUMENT ORIENTATION

Effect of off-south orientation on the performance of
collector reflector system in India p 30 A83-14671

INSULATION

Mass balance on the arc mode seed electrodes
p 154 N83-16211

INSULATORS

The fabrication and evaluation of a silicon photovoltaic
cell with a directly n-doped tunnel insulator
p 45 N83-10564

INTEGRATED ENERGY SYSTEMS

Integrated solar energy system optimization
p 26 A83-13477
Regional energy planning Some suggestions to public
administration
[CISE-1795] p 19 N83-14765
Develop and test fuel cell powered on-site integrated
total energy system
[NASA-CR-168020] p 140 N83-15839

INTERFACES

The 40kW fuel cell field test support
[PB82-231630] p 133 N83-13633
Distributed photovoltaic systems Utility interface issues
and their present status Intermediate/three-phase
systems --- power conditioning
[NASA-CR-169684] p 61 N83-14686

INTERFEROMETERS

Faraday-rotation measurements in ISX-B
[DE82-011507] p 127 N83-10953

INTERNAL COMBUSTION ENGINES

Diesel driven low capacity heat pump for heating and
hot water production
[BMFT-FB-T-82-128] p 7 N83-11592
Evaluation of plasma jet ignition for improved
performance of alternate fuels
[AD-A120160] p 112 N83-16212

INTERNAL ENERGY

Internal reforming for natural gas fueled molten
carbonate fuel cells
[PB82-200676] p 128 N83-11607

INTERPOLATION

Multivariable stability-margin optimisation with
decoupling and output regulation p 2 A83-16191

INTERPROCESSOR COMMUNICATION

CAMAC based inter-computer communications system
[DE82-002879] p 156 N83-16233

INVESTMENT

An economic evaluation of solar energy
p 45 N83-10549

INVESTMENTS

Commercialization of parabolic dish systems
p 44 N83-10540

ION BEAMS

Sausage instability of Z-discharged plasma channel in
LIB-fusion device
[IPPJ-602] p 123 N83-10917
Beam and deposition stability in light-ion fusion targets
[DE82-017768] p 134 N83-13993
Heavy-ion inertial fusion Initial survey of target gain
versus ion-beam parameters
[DE82-003069] p 138 N83-15117
Fusion at counterstreaming ion beams Ions Optic
Fusion (IOF) p 151 N83-16124
Ion velocity measurements for laser mass ablation
studies p 152 N83-16128

ION CYCLOTRON RADIATION

Antenna-plasma coupling theory for ICRF heating of
large tokamaks
[DE82-013226] p 125 N83-10933

ION DISTRIBUTION

Study of the ionic distribution and of the energy
deposition in a plasma of Tokamak heated by injection
of fast neutrals
[EUR-CEA-FC-1094] p 155 N83-16226

ION ENGINES

Advances in series resonant inverter technology and
its effect on spacecraft employing electric propulsion
[AIAA PAPER 82-1881] p 114 A83-12466

ION EXCHANGE MEMBRANE ELECTROLYTES

Transport properties of Nafion membranes for use in
three-electrode photoelectrochemical storage cells
p 160 A83-12055

ION IMPLANTATION

CW-laser annealed solar cells p 23 A83-10638
Self-annealed ion implanted solar cells
p 25 A83-12290
Cell and module formation research area
p 41 N83-10522
Applications of materials surface modification to prime
power systems p 144 N83-15878

ION INJECTION

Numerical simulation of collective ion acceleration
p 152 N83-16127
Stabilization of axisymmetric mirror plasma by energetic
ion injections
[DE81-030341] p 155 N83-16229

ION IRRADIATION

Nonlinear algorithms application to irradiated solar cell
parameters evaluation p 62 N83-14700

ION MOTION

Ion kinetic effects on the tilt mode in FRCs
[DE82-002329] p 155 N83-16227

ION SCATTERING

Fusion at counterstreaming ion beams Ions Optic
Fusion (IOF) p 151 N83-16124
Effect of low-frequency density fluctuations on
ion-cyclotron waves
[DE82-002829] p 155 N83-16222

ION SOURCES

Numerical simulation of collective ion acceleration
p 152 N83-16127

IONIZATION

External ionization mechanisms for advanced thermionic
converters p 120 N83-10496
Plasma parameter measurements using
neutral-particle-beam attenuation
[DE82-021120] p 132 N83-13001
Electron impact ionization of highly charged
molybdenum impurities in Tokamak plasmas
p 151 N83-16119
Dynamics of ionization and transport in a magnetically
confined plasma column p 153 N83-16132

IONIZING RADIATION

Solar cell radiation handbook
[NASA-CR-169662] p 61 N83-14687

IONS

Production and experimental study of the dissipative
trapped ion instability p 123 N83-10910

IRON

Electromagnetic studies of redox systems for energy
storage
[NASA-CR-169593] p 165 N83-14667

IRON COMPOUNDS

Performance characteristics of heavy media cyclones
using fly ash-derived heavy media p 88 N83-10574

IRRADIANCE

Calibration of solar cells by the reference cell method
- The spectral mismatch problem p 28 A83-13580
Ion velocity measurements for laser mass ablation
studies p 152 N83-16128

IRRIGATION

Darrieus wind-turbine and pump performance for low-lift
irrigation pumping p 131 N83-12564
[DE82-016270]
The USDA agricultural wind energy research program
p 147 N83-15914

ISOLATION

Development of newer methods for the isolation and
identification of certain components found in complex
mixtures derived from energy sources and the
determination of their toxicity via bioassay systems
[DE82-019043] p 81 N83-10140

ISOTOPE SEPARATION

Laser-isotope-separation technology
[DE81-030114] p 104 N83-14197

ISOTOPES

An integrated model for the natural flow regime in the
Cerro Prieto hydrothermal system, B.C., Mexico, based
upon petrological and isotope geochemical criteria
[DE82-001890] p 107 N83-14658

ISOTOPIC ENRICHMENT

Laser-isotope-separation technology
[DE81-030114] p 104 N83-14197

ISOTROPIC TURBULENCE

Sufficient stability condition for alpha-driven
velocity-space modes in compression Tokamak
[IPPJ-609] p 131 N83-12996

ITERATIVE SOLUTION

Techniques for the solution of MHD generator flows
[AIAA PAPER 83-0465] p 118 A83-17928

J

JET ENGINE FUELS

A carbon-13 and proton nuclear magnetic resonance
study of some experimental referee
broadened-specification /ERBS/ turbine fuels
p 78 A83-11482

Refining of military jet fuels from shale oil Part 1
Preliminary process design, economic and yield
optimization, and computer modeling
[AD-A117511] p 83 N83-10210

An exploratory research and development program
leading to specifications for aviation turbine fuel from whole
crude shale oil Part 4 Production of samples of military
fuels from raw shale oils
[AD-A117526] p 83 N83-10211

Recent trends in aviation turbine fuel properties
[NASA-TP-2056] p 92 N83-11340

Antimisting kerosene atomization and flammability
[NASA-CR-169385] p 95 N83-12246

Frictional characteristics and heat transfer of antimisting
fuels in tubes
[NASA-CR-169388] p 96 N83-12248

Analytical techniques for aromatic components in aircraft
fuels
[AD-A118838] p 96 N83-12252

Pyrolysis of organic compounds containing long
unbranched alkyl groups
[AD-A119749] p 104 N83-14165

The effect of additives on the aerosolization of JP-5
jet fuel
[AD-A119324] p 106 N83-14294

JET ENGINES

The fuel efficient jet engine
[PNR-90114] p 7 N83-11136

JET STREAMS (METEOROLOGY)

Aerodynamic platform companion for jet-stream
electricity generation p 116 A83-16102

On the rotary wing concept for jet stream electricity
generation p 117 A83-16111

JOINING

Evaluation of electrode shape and nondestructive
evaluation method for welded solar cell interconnects
[NASA-TM-82966] p 45 N83-10555

K

KEROGEN

Geochemical studies of cores from the San Juan Basin
Research Site, Grants Uranium Region, New Mexico
[DE82-004153] p 108 N83-14795

Reaction kinetics and diagnostics for oil-shale
retorting
[DE82-001598] p 112 N83-15952

KEROSENE

Antimisting kerosene atomization and flammability
[NASA-CR-169385] p 95 N83-12246

Frictional characteristics and heat transfer of antimisting
fuels in tubes
[NASA-CR-169388] p 96 N83-12248

KINETIC ENERGY

KINETIC ENERGY

Fluidized-bed pyrolysis of oil shale: Oil yield, composition, and kinetics
[DE82-021010] p 97 N83-12571

KINETICS

Ion kinetic effects on the tilt mode in FRCs
[DE82-002329] p 155 N83-16227

L

LANDFILLS

Demonstration of landfill gas enhancement techniques in landfill simulators p 88 N83-10594
Research, development and demonstration in the design of sanitary landfill to optimize the generation and capture of compressible gas p 89 N83-10595
Landfill gas recovery: An analysis of results p 89 N83-10596

LANDING AIDS

Instrument landing system localizer receiver performance in the presence of co-channel interference [AD-A118909] p 99 N83-13089

LANDSAT SATELLITES

Exploration for fractured petroleum reservoirs using radar/Landsat merge combinations p 77 A83-10031
Landsat for resource evaluation and management in the Alberta foothills p 80 A83-14256
Automatic interpretation of MSS-LANDSAT data applied to coal refuse site studies in southern Santa Catarina State, Brazil [E83-10066] p 18 N83-14575

LANTHANUM COMPOUNDS

Particle size distribution of Ni microprecipitates in LaNi5 used for hydrogen storage p 75 A83-12295

LARGE SPACE STRUCTURES

Analytical prediction of the dynamic in-orbit behavior of large flexible solar arrays p 65 N83-14723
Large area space solar cell assemblies p 68 N83-15810
Materials technology for large space structures p 171 N83-15882

LARGE SPACE TELESCOPE

Space Telescope Solar panel assembly thermal test analysis p 65 N83-14724
Progress and development status of the Space Telescope solar array p 67 N83-14736
Future developments and applications for the Space Telescope solar array p 67 N83-14737

LARMOR RADIUS

High-n collisionless ballooning modes in axisymmetric toroidal plasmas [DE82-002831] p 154 N83-16217

LASER ANNEALING

CW-laser annealed solar cells p 23 A83-10638

LASER APPLICATIONS

Laser-isotope-separation technology [DE81-030114] p 104 N83-14197

LASER FUSION

Neutron attenuation in the laser ducts of an inertial-confinement fusion reactor [DE82-007195] p 126 N83-10947
Coating of laser fusion targets by plasma polymerized organic thin films p 152 N83-16126
Helios movable Hartmann ball [DE82-000756] p 155 N83-16220

LASER HEATING

Volatile production during preignition heating [DE82-003061] p 109 N83-15402

LASER MICROSCOPY

Evaluation of solar cell welds by scanning acoustic microscopy p 72 N83-15834

LASER PUMPING

Status, research requirements and potential applications for nuclear pumped lasers p 143 N83-15882

LASER TARGETS

Energy and technology review [DE82-019371] p 137 N83-14747
Ion velocity measurements for laser mass ablation studies p 152 N83-16128
Helios movable Hartmann ball [DE82-000756] p 155 N83-16220

LAUNCHING BASES

Case for a Space Center in the Arabian Gulf p 2 A83-18812

LEACHING

Parametric study of geohydrologic performance characteristics for nuclear-waste repositories [DE82-003145] p 17 N83-13973

LEAD (METAL)

Analysis of target implosion irradiated by proton beam
1. Beam interaction with target plasma [IPPJ-612] p 134 N83-13989

LEAD ACID BATTERIES

Electron conductivity of the active masses of lead acid batteries during discharge and permanent service [BMFT-FB-T-82-078] p 161 N83-10619
Research, development, and demonstration of advanced lead-acid batteries for utility load leveling [DE82-019796] p 162 N83-11584

LEAD ALLOYS

Demonstration Tokamak power plant study [DE82-016182] p 125 N83-10937

LIFE CYCLE COSTS

The application of energy saving concepts to future fighter/attack aircraft design [AIAA PAPER 83-0092] p 2 A83-16516
Economic efficiency in the sizing of residential heat pumps [PB82-179029] p 3 N83-10401
Comparative analysis of economic models in selected solar energy computer programs [PB82-184995] p 55 N83-12589
Market assessment of photovoltaic power systems for agricultural applications worldwide [NASA-CR-165541] p 56 N83-13585

LIFE SUPPORT SYSTEMS

Testing of an improved lithium-sulfur dioxide battery for aircrew life support equipment [AD-A119374] p 163 N83-13592

LIGHT (VISIBLE RADIATION)

Theoretical and experimental investigation of high temperature insulators subjected to intense visible radiation [AIAA PAPER 83-0158] p 35 A83-16562
The phototron: A light to RF energy conversion device p 143 N83-15866

LIGHT EMITTING DIODES

Proceedings of International Topical Meeting on ICF Research by Light-Ion Beam [IPPJ-611] p 138 N83-15126

LIGHT IONS

Transport of light-ion beams in plasma channels [DE82-001649] p 139 N83-15140

LIGHT SOURCES

A proposed optical pumping system requiring no electric power p 143 N83-15861

LIGHT SPEED

Transport of light-ion beams in plasma channels [DE82-001649] p 139 N83-15140

LIGHT TRANSMISSION

Transport of solar energy with optical fibres p 29 A83-13698

LINEAR ACCELERATORS

Accelerator and fusion research division [DE82-012361] p 124 N83-10930

LINEAR SYSTEMS

Multivariable stability-margin optimisation with decoupling and output regulation p 2 A83-16191

LININGS

Perform experiments on LINUS-O and LTX imploding liquid liner fusion systems [AD-A120052] p 154 N83-16214

LIQUEFACTION

Phase equilibrium studies for methane/synthesis gas separation The hydrogen-carbon monoxide-methane system [PB82-200637] p 95 N83-12208
Catalytic liquefaction of biomass [DE82-003329] p 108 N83-14752

LIQUEFIED NATURAL GAS

Welding of AL-MG alloy 5083-O for the construction of LNG storage tanks p 93 N83-11500
Assessment of research and development needs for methane-fueled engine systems [PB82-199035] p 97 N83-12257
Scale effects in liquefied fuel vapor dispersion [DE82-006198] p 11 N83-12659
The behavior of LNG vapor clouds Wind-tunnel simulation of 40 M3 LNG spill tests at China Lake Naval Weapons Center, California [PB82-199027] p 12 N83-12665
LNG plume interaction with surface obstacles [PB82-198955] p 12 N83-12666
Thermal analysis of the position of the freezing front around an LNG in-ground storage tank with a heat barrier p 110 N83-15712

LIQUID FUELS

A carbon-13 and proton nuclear magnetic resonance study of some experimental reference broadened-specification /ERBS/ turbine fuels p 78 A83-11482

LIQUID HELIUM 2

Utilizing subcooled, superfluid He-II in the design of a 12-Tesla tandem-mirror experiment [DE82-003322] p 138 N83-15133

LIQUID METALS

Radiant heating tests of several liquid metal heat-pipe sandwich panels [AIAA PAPER 83-0319] p 157 A83-16649
Liquid-metal MHD for space power systems p 141 N83-15850
Solar MHD systems with two-phase flow with magnetic liquid metal p 141 N83-15851
Liquid ribbon radiator for lightweight space radiator systems p 145 N83-15895

LIQUID NEON

NASA Lewis Research Center combustion MHD experiment p 141 N83-15847

LIQUID PHASE EPITAXY

Grown-in defects and defects produced by 1-Me electron irradiated in AlO 3GaO 7As P-N junction solar cells p 71 N83-15828

LIQUID PHASES

Liquid phase thermochemical energy conversion systems - An application of Diels-Alder chemistry p 118 A83-17149

LIQUID WASTES

Tritium waste control October 1980 - March 1981 [DE82-002088] p 20 N83-14774
Vitrification of high-level radioactive waste in a small-scale joule-heated ceramic melter [DE82-002227] p 21 N83-15113

LIQUID-SOLID INTERFACES

Design of a 13% efficient n-GaAs/1-x/P/x/ semiconductor-liquid junction solar cell p 36 A83-17801
Startup conditions of alkali-metal vaporization from rectangular channels -- in heat pipes p 157 A83-18446

LIQUID-VAPOR EQUILIBRIUM

Liquid-vapor equilibrium for ternary natural gas system [PB82-227679] p 82 N83-10160
Phase equilibrium studies for methane/synthesis gas separation The hydrogen-carbon monoxide-methane system [PB82-200637] p 95 N83-12208

LIQUID-VAPOR INTERFACES

Use of thermocapillary migration in a controllable heat valve p 156 A83-16093

LIQUIDS

Thermodynamic data for desulfurization processes [PB82-184904] p 95 N83-12207
Low cost solar array project cell and module formation research area Process research of non-CZ silicon material [NASA-CR-169632] p 59 N83-14671
The need for improved heat pipe fluids p 159 N83-15892

LISTS

Authors guide to publishing in the fields of plasma physics and controlled fusion [DE82-002866] p 155 N83-16230

LITERATURE

Heat transfer - A review of 1981 literature p 169 A83-17701

LITHIUM

Ambient temperature rechargeable lithium battery [AD-A119297] p 166 N83-14742

LITHIUM CHLORIDES

Sources of pressure in lithium thionyl chloride batteries p 160 A83-12054
High efficiency lithium-thionyl chloride cell [AD-A118696] p 131 N83-12537
Studies leading to the development of high-rate lithium-sulfuryl chloride battery technology [AD-A120853] p 146 N83-15901
Studies leading to the development of high-rate lithium sulfuryl chloride battery technology [AD-A120002] p 146 N83-15907

LITHIUM SULFUR BATTERIES

Sources of pressure in lithium thionyl chloride batteries p 160 A83-12054
Spectroscopic studies of the hazards of Li/SOCl2 batteries during anode-limited cell reversal p 114 A83-12056

Correlation of design with performance of primary lithium-sulfur oxyhalide cells [NASA-CR-169369] p 120 N83-10504
Technology-base research project for electrochemical storage report for 1981 [DE82-020599] p 163 N83-12573

Testing of an improved lithium-sulfur dioxide battery for aircrew life support equipment [AD-A119374] p 163 N83-13592

Lithium/sulfur dioxide cell and battery safety [NASA-RP-1099] p 135 N83-14684

LOADING MOMENTS

Energy efficient face seal [NASA-CR-165591] p 21 N83-15659

SUBJECT INDEX

LOADING OPERATIONS

- Development, construction, and experimental operation of an improved chainless haulage system for drum-shearer loaders
[BMFT-FB-T-82-102] p 158 N83-10428
- Pneumatic stowing with lateral discharge in coal faces with thick seams
[BMFT-FB-T-82-074] p 90 N83-10817

LOGARITHMS

- Use of wireline logs at Cerro Prieto in identification of the distribution of hydrothermally altered zones and dike locations and their correlation with reservoir temperatures
[DE82-001981] p 107 N83-14661

LOGISTICS MANAGEMENT

- Alternative means of coping with national energy emergencies
[DE82-002812] p 21 N83-15955

LONGERONS

- Extendible and retractable masts for solar array developments
p 65 N83-14725

LOSSES

- Reduction of neoclassical losses in magnetic-confinement devices
[DE82-020277] p 132 N83-13003
- Loss currents of solar cells under Low Earth Orbit (LEO) conditions
p 65 N83-14721

LOUISIANA

- Hydrogeochemical and stream-sediment reconnaissance basic data for Beaumont, Lake Charles and Baton Rouge quadrangles, Texas, Louisiana. Uranium Resource Evaluation Project
[DE82-020438] p 102 N83-13554

LOW COST

- Large-area sheet task advanced dendritic web growth development
[NASA-CR-169624] p 58 N83-14665
- Large area low-cost space solar cell development
p 62 N83-14699
- Air Force development of thin GaAs solar cells
p 69 N83-15816

LOW TEMPERATURE

- Dynamics of ionization and transport in a magnetically confined plasma column
p 153 N83-16132

LUBRICATING OILS

- Energy efficient face seal
[NASA-CR-165591] p 21 N83-15659

LUMINESCENCE

- Luminescent solar concentrators - A review
p 28 N83-13581
- Hot-electron luminescence in aged electrodeposited CdSe liquid-junction solar cell
p 36 N83-16946
- The luminescent solar concentrator
p 48 N83-10902

LUMINOUS INTENSITY

- Photosynthetic water splitting
[PB82-200684] p 76 N83-12206

M

MACHINERY

- Development, construction, and experimental operation of an improved chainless haulage system for drum-shearer loaders
[BMFT-FB-T-82-102] p 158 N83-10428

MAGNESIUM ALLOYS

- Welding of AL-MG alloy 5083-0 for the construction of LNG storage tanks
p 93 N83-11500

MAGNESIUM OXIDES

- Optical properties of gold-magnesia selective cermets — for solar collectors
p 33 N83-15482

MAGNET COILS

- Parametric systems analysis of the Modular Stellarator Reactor (MSR)
[DE82-016244] p 126 N83-10945
- Conceptual design for a modular-stellarator fusion-reactor magnet
[DE82-002863] p 138 N83-15135

MAGNETIC COILS

- Utilizing subcooled, superfluid He-II in the design of a 12-Tesla tandem-mirror experiment
[DE82-003322] p 138 N83-15133
- Magnet and conductor developments for the mirror fusion program
[DE82-001062] p 139 N83-15136

MAGNETIC COMPRESSION

- Curvilinear coordinates for magnetic confinement geometries
[DE82-019733] p 124 N83-10928
- Sufficient stability condition for alpha-driven velocity-space modes in compression Tokamak
[IPPJ-609] p 131 N83-12996

MAGNETIC DIFFUSION

- Plasma equilibrium and field diffusion during current rise phase of STP-2 screw pinch Tokamak
[IPPJ-594] p 123 N83-10919

MAGNETIC EFFECTS

- Prime power for high-energy space systems. Certain research issues
p 143 N83-15863

MAGNETIC FIELD CONFIGURATIONS

- Equilibrium poloidal field distributions in reversed-field-pinch toroidal discharges
[DE82-014130] p 134 N83-13996
- Radial guiding-center drifts and omnigenerity in bumpy-torus confinement systems
[DE82-019802] p 135 N83-14000

MAGNETIC FIELDS

- On the optimization of magnetic field sources in electromechanical energy conversion
p 112 N83-10641
- Plasma equilibrium and field diffusion during current rise phase of STP-2 screw pinch Tokamak
[IPPJ-594] p 123 N83-10919
- Rippling modes in the edge of a Tokamak plasma
[DE82-007724] p 125 N83-10940
- Anisotropy in MHD turbulence due to a mean magnetic field
[NASA-TM-84000] p 131 N83-12998
- Reduction of neoclassical losses in magnetic-confinement devices
[DE82-020277] p 132 N83-13003
- Simulation code of relativistic electron beam diodes
p 153 N83-16138

MAGNETIC FLUX

- Measurements of magnetic field fluctuations in the Caltech research Tokamak
p 124 N83-10925

MAGNETIC INDUCTION

- Detonation driven induction generators with parallel and antiparallel external and induced magnetic fields
p 118 N83-17371

MAGNETIC LEVITATION VEHICLES

- Power conditioning unit development for MAG-TRANSIT
p 113 N83-11021

MAGNETIC MEASUREMENT

- Measurements of magnetic field fluctuations in the Caltech research Tokamak
p 124 N83-10925
- Deuterium flux measurements in the edge plasmas of PLT and PDX during auxiliary heating experiments
[DE82-001809] p 139 N83-15143

MAGNETIC MIRRORS

- Technology spin-offs from the magnetic fusion energy program
[DE82-016923] p 123 N83-10897
- Production and experimental study of the dissipative trapped ion instability
p 123 N83-10910
- US-Japan Joint Institute for Fusion Theory Workshop on Nonequilibrium Statistical Physics Problems in Fusion Plasmas: Stochasticity and Chaos
[IPPJ-587] p 123 N83-10920
- US-Japan Joint Institute for Fusion Theory Workshop on Equilibrium, Stability and Transport of Nonaxisymmetric Systems
[IPPJ-577] p 124 N83-10922
- Instabilities driven by the parallel variation of the electrostatic potential in tandem
[DE82-018409] p 126 N83-10941
- Reduction of neoclassical losses in magnetic-confinement devices
[DE82-020277] p 132 N83-13003
- Utilizing subcooled, superfluid He-II in the design of a 12-Tesla tandem-mirror experiment
[DE82-003322] p 138 N83-15133
- Magnet and conductor developments for the mirror fusion program
[DE82-001062] p 139 N83-15136

MAGNETIC STORMS

- Environmentally induced discharges in a solar array
p 36 N83-17493

MAGNETIC SURVEYS

- A multi-site magnetotelluric measurement system with real-time data analysis
[DE82-020596] p 98 N83-12704

MAGNETIC VARIATIONS

- Measurements of magnetic field fluctuations in the Caltech research Tokamak
p 124 N83-10925

MAGNETIZATION

- The 30-MJ superconducting magnetic energy storage for BPA transmission-line stabilizer
[DE82-002355] p 165 N83-14414

MAGNETOELECTRIC MEDIA

- Numerical simulation of the interaction of an electromagnetic wave with an inhomogeneous plasma
p 154 N83-16140

MAGNETOHYDRODYNAMIC FLOW

- Coupled three-dimensional flow and electrical calculations for Faraday MHD generators
p 117 N83-16107

MAGNETOHYDRODYNAMIC STABILITY

- Techniques for the solution of MHD generator flows
[AIAA PAPER 83-0465] p 118 N83-17928

MAGNETOHYDRODYNAMIC GENERATORS

- Loading schemes for a 50 MWth diagonally connected MHD generator
p 113 N83-10659
- End region effects upon the performance of a magnetohydrodynamic channel
p 113 N83-10665
- Computational model of a diffuse discharge on electrodes in a weakly ionized plasma
p 114 N83-11952
- Emission characteristics of refractory materials — as electrodes in aerodynamic generators
p 116 N83-16019
- Thermionically emitting copper cathode in contact with combustion plasmas
p 116 N83-16101
- NOx formation experiments in an MHD simulation facility
p 116 N83-16103
- Inflow disk generator for open-cycle MHD power generation
p 116 N83-16104
- The STD/MHD codes - Comparison of analyses with experiments — MHD generator performance prediction and tests
p 116 N83-16105
- Study of electrical faults in magnetohydrodynamic Faraday generators
p 116 N83-16106
- Coupled three-dimensional flow and electrical calculations for Faraday MHD generators
p 117 N83-16107
- Extremal MHD generator
p 117 N83-16110
- Performance results of a 300 MWth generator at high magnetic field
[AIAA PAPER 83-0394] p 117 N83-16690
- Transient flow analysis of the AEDC/HPDE MHD generator
[AIAA PAPER 83-0395] p 117 N83-16691
- Three-dimensional fluid and electrodynamic modeling for MHD DCW channels
[AIAA PAPER 83-0464] p 117 N83-16732
- Toroidal flow coal-fired MHD combustor design study and tests
[AIAA PAPER 83-0467] p 118 N83-16734
- Methods of reducing energy consumption of the oxidant supply system for MHD/steam power plants
[AIAA PAPER 83-0468] p 118 N83-16735
- Remote sensing of coal-fired MHD by optical diagnostic techniques
p 80 N83-16736
- Detonation driven induction generators with parallel and antiparallel external and induced magnetic fields
p 118 N83-17371
- Techniques for the solution of MHD generator flows
[AIAA PAPER 83-0465] p 118 N83-17928
- Three-dimensional current distribution in coal-fired MHD channels
[DE82-016958] p 99 N83-13005
- Research needs. Prime-power for high energy space systems
[AD-A119243] p 135 N83-14156
- Magnetohydrodynamic power supply systems for space applications
p 141 N83-15852
- Potential role and technology status of closed-cycle MHD for light-weight nuclear space-power systems
p 142 N83-15853
- MHD generator research at Stanford
p 142 N83-15854
- Overview of space reactors
p 142 N83-15855
- Compact, high-power nuclear reactor systems based on small diameter particulate fuel
p 143 N83-15859
- Radiation-driven MHD systems for space applications
p 144 N83-15867
- Materials for high power MHD systems
p 144 N83-15872
- Mass balance on the arc mode seed electrodes
p 154 N83-16211

MAGNETOHYDRODYNAMIC STABILITY

- Sausage instability of Z-discharged plasma channel in LIB-fusion device
[IPPJ-602] p 123 N83-10917
- US-Japan Joint Institute for Fusion Theory Workshop on Equilibrium, Stability and Transport of Nonaxisymmetric Systems
[IPPJ-577] p 124 N83-10922
- Observation of the parametric decay instability during electron cyclotron resonance heating on the Versator 2 Tokamak
[DE82-012573] p 125 N83-10939
- Instabilities driven by the parallel variation of the electrostatic potential in tandem
[DE82-018409] p 126 N83-10941
- Resistive MHD studies of high-beta Tokamak plasmas
[DE82-008101] p 126 N83-10942
- Parametric systems analysis of the Modular Stellarator Reactor (MSR)
[DE82-016244] p 126 N83-10945
- Analysis of stabilization effect of quadrupole field on theta pinch plasmas
[IPPJ-608] p 131 N83-12995

- Beam and deposition stability in light-ion fusion targets
[DE82-017768] p 134 N83-13993
- Resistive MHD studies of high-beta-Tokamak plasmas
[DE82-001478] p 139 N83-15141
- Computer simulations of reflex E-beam systems and plasma stability p 151 N83-16123
- Ion kinetic effects on the tilt mode in FRCs
[DE82-002329] p 155 N83-16227
- Stabilization of axisymmetric mirror plasma by energetic ion injections
[DE81-030341] p 155 N83-16229
- MAGNETOHYDRODYNAMIC WAVES**
- Wildcat. A catalyzed D-D Tokamak reactor
[DE82-013712] p 125 N83-10938
- MAGNETOHYDRODYNAMICS**
- Behavior of a plasma in a high-density gas-embedded Z-pinch configuration
[DE82-017396] p 125 N83-10935
- Anisotropy in MHD turbulence due to a mean magnetic field
[NASA-TM-84000] p 131 N83-12998
- Methods of reducing energy consumption of the oxidant supply system for MHD/steam power plants
[NASA-TM-83025] p 133 N83-13589
- Conceptual design for a modular-stellarator fusion-reactor magnet
[DE82-002863] p 138 N83-15135
- Resistive MHD studies of high-beta-Tokamak plasmas
[DE82-001478] p 139 N83-15141
- Multidimensional MHD computations for the field-reversed theta pinch and the reversed-field pinch
[DE82-004361] p 139 N83-15142
- MHD power Overview p 140 N83-15846
- NASA Lewis Research Center combustion MHD experiment p 141 N83-15847
- The MHD disk generator as a multimewatt power supply operating with chemical and nuclear sources p 141 N83-15848
- Self-excited MHD power source for space applications p 141 N83-15849
- Liquid-metal MHD for space power systems p 141 N83-15850
- Solar MHD systems with two-phase flow with magnetic liquid metal p 141 N83-15851
- Radiation-driven MHD systems for space applications p 144 N83-15867
- Ceramics for high power sources in space p 171 N83-15881
- MAGNETOPLASMA DYNAMICS**
- Three-dimensional fluid and electrodynamic modeling for MHD DCW channels
[AIAA PAPER 83-0464] p 117 A83-16732
- MAGNETOSPHERE**
- Interaction between the SPS solar power satellite solar array and the magnetospheric plasma p 73 N83-15868
- MAGNETRON SPUTTERING**
- Optical properties of gold-magnesia selective cermet for solar collectors p 33 A83-15482
- Effect of hydrogen on the deposition rate for planar RF magnetron sputtering of hydrogenated amorphous silicon p 35 A83-16082
- MAGNETS**
- Operating and maintenance experience with a 6-kW wind energy conversion system at Naval Station, Treasure Island, California
[AD-A119389] p 136 N83-14740
- MAINTENANCE**
- Project analysis and integration area p 41 N83-10524
- Operating and maintenance experience with a 6-kW wind energy conversion system at Naval Station, Treasure Island, California
[AD-A119389] p 136 N83-14740
- Engineering features of the INTOR conceptual design
[DE82-002808] p 156 N83-16232
- MALFUNCTIONS**
- Intermediate photovoltaic system application experiment operational performance report. Volume 3 Beverly High School, Beverly, Massachusetts
[DE82-006236] p 50 N83-12543
- MAN ENVIRONMENT INTERACTIONS**
- The use of near color infrared photography to assess the impact of the oil and natural gas industry on Louisiana's wetlands p 1 A83-10069
- MANAGEMENT**
- Risks, regulation responsibilities and costs in nuclear waste management: A preliminary survey in the European Community
[EUR-6893] p 21 N83-15115
- MANAGEMENT PLANNING**
- Recommendation on national radioactive waste management policies
[DE81-029916] p 17 N83-13972

- MANPOWER**
- Project analysis and integration area p 41 N83-10524
- MANUFACTURING**
- Research, development, and demonstration of advanced lead-acid batteries for utility load leveling
[DE82-019796] p 162 N83-11584
- The 40 kW intermediate SWECS program p 148 N83-15925
- MAPPING**
- Scatterplate flux mapping for solar concentrators
[DE82-021359] p 54 N83-12588
- MARANGONI CONVECTION**
- Use of thermocapillary migration in a controllable heat valve p 156 A83-16093
- MARINE BIOLOGY**
- Microbiological studies towards optimization of methane from marine plant biomass
[PB82-214362] p 92 N83-10756
- MARINE ENVIRONMENTS**
- National Marine Pollution Program Plan Federal plan for ocean pollution research, development and monitoring Fiscal years, 1981 - 1985
[PB82-218462] p 6 N83-10656
- MARINE TECHNOLOGY**
- The use of buoyancy to lift heavy objects from the sea
[AD-A119320] p 106 N83-14306
- MARINE TRANSPORTATION**
- Application of fuel cells to highway and nonhighway transportation
[DE82-004365] p 156 N83-16259
- MARKET RESEARCH**
- PV large systems project p 40 N83-10512
- Cogeneration Energy Systems assessment Volume 2 Technical discussion
[PB82-200692] p 8 N83-11609
- Market assessment of photovoltaic power systems for agricultural applications worldwide
[NASA-CR-165541] p 56 N83-13585
- Prospects for foreign applications of wind-energy systems, preliminary report in response to Public Law 96-345
[DE82-007930] p 19 N83-14745
- MARKETING**
- The worldwide market for photovoltaics in the rural sector
[NASA-TM-83035] p 73 N83-15840
- MARTENSITIC STAINLESS STEELS**
- Fusion materials Adapting to realistic reactor environments
[DE82-002708] p 138 N83-15132
- MASKS**
- Low cost solar array project cell and module formation research area Process research of non-CZ silicon material
[NASA-CR-169632] p 59 N83-14671
- MASS FLOW**
- An analytical investigation of mass flow, pressure and temperature in a flat-plate solar collector p 37 A83-18452
- MASS SPECTROSCOPY**
- Automated probe microdistillation/mass spectrometry for the analysis of high-molecular weight compounds in fossil fuels
[PB82-022039] p 95 N83-12202
- Analytical techniques for aromatic components in aircraft fuels
[AD-A118838] p 96 N83-12252
- MASS TRANSFER**
- Gasification kinetics for biomass decomposition
[PB82-199043] p 97 N83-12256
- A computer simulation model of salt-gradient solar ponds p 55 N83-13580
- Mass balance on the arc mode seed electrodes p 154 N83-16211
- MATERIALS RECOVERY**
- Demonstration of synergistic industrial energy/municipal solid waste disposal facility
[DE82-001145] p 99 N83-13041
- MATHEMATICAL MODELS**
- The spectrum of wind speed fluctuations encountered by a rotating blade of a wind energy conversion system p 114 A83-13695
- Mathematical model for the analysis of wind-turbine wakes p 117 A83-16108
- Some comments on the World Energy Conference (WEC) energy demand model
[USIP-82-04] p 15 N83-13628
- A reference-maternal system for estimating health and environmental risks of selected maternal cycles and energy systems
[DE82-019309] p 15 N83-13647
- Numerical simulation of fluid flow in porous/fractured media
[DE82-002631] p 107 N83-14454

- Mathematical modeling of TES subsystems
[DE82-000168] p 168 N83-15950
- MATHEMATICAL PROGRAMMING**
- Water demand for generating electricity: A mathematical programming approach with application in Poland
[IASA-RR-82-16] p 158 N83-10498
- MATRICES (MATHEMATICS)**
- Development of technique for AR coating nickel and copper metallization of solar cells FPS project product development p 60 N83-14679
- MATRIX MATERIALS**
- Solar energy conversion based on the principle of fluorescent collectors
[BMFT-FB-T-82-081] p 47 N83-10621
- MEASURING INSTRUMENTS**
- Commercial Photovoltaics Measurements Workshop, Vail, CO, July 27-29, 1981, Proceedings p 32 A83-15452
- A manufacturer's perspective of measurement equipment needs for the photovoltaics industry p 32 A83-15454
- A simple parameter measurement system for solar cells p 38 A83-18825
- A survey of spectral response measurements for photovoltaic devices
[DE82-006221] p 50 N83-12545
- Energy and technology review
[DE82-019371] p 137 N83-14747
- MECHANICAL DEVICES**
- Positive displacement rotary vapor compressor for vapor compression --- for waste steam utilization
[PB82-227620] p 3 N83-10429
- MECHANICAL DRIVES**
- Operational experience on MP-200 series commercial wind turbine generators p 147 N83-15917
- MECHANICAL ENGINEERING**
- Investigation of engineering and design considerations in selecting conveyors for densified Refuse-Derived Fuel (dRDF) and dRDF Coal mixtures
[AD-A119065] p 107 N83-14495
- ARASAT solar array p 66 N83-14733
- MECHANICAL PROPERTIES**
- Magnetoelastic instabilities and vibrations of superconducting-magnet systems
[DE82-015206] p 123 N83-10880
- Performance criteria for photovoltaic energy systems, volume 2 p 56 N83-13597
- Structural characterization of materials for high energy space systems p 171 N83-15883
- MELTING POINTS**
- Evaluation of methods for rapid determination of freezing point of aviation fuels
[NASA-CR-167981] p 83 N83-10207
- MEMBRANE STRUCTURES**
- Transport properties of Nafion membranes for use in three-electrode photoelectrochemical storage cells p 160 A83-12055
- MEMBRANES**
- Membrane controlled anaerobic digestion p 65 N83-10497
- MERCURY CADMIUM TELLURIDES**
- Field ionization of deep levels in semiconductors with applications to Hg^{1-x}Cd^x/Te p-n junctions p 156 A83-16089
- MESOSCALE PHENOMENA**
- An assessment of wind energy resource for northwestern California p 80 A83-18456
- METAL COATINGS**
- Black chrome solar selective coatings optimized for high temperature applications p 33 A83-15479
- An investigation of deposition parameter dependence of optical properties, microstructure and thermal stability of black chrome selective surfaces p 34 A83-15497
- Development of an all-metal thick film cost effective metallization system for solar cells
[NASA-CR-169635] p 59 N83-14674
- METAL FIBERS**
- The effect of the parameters of metal-fiber capillary structures on the maximum heat-transfer capability of thermal pipes p 156 A83-11515
- METAL FILMS**
- Sol-gel protective coatings for black chrome solar selective films
[DE82-004138] p 74 N83-15942
- METAL HYDRIDES**
- Metallurgy of rechargeable hydrides p 160 A83-11509
- Hydrogen recovery from supplemented natural gas by metal hydrides
[DE82-002445] p 76 N83-14303
- METAL OXIDES**
- Method for depositing an oxide coating
[NASA-CASE-LEW-13131-1] p 39 N83-10494

METAL SPINNING

- Feasibility study of solid surface subreflector production techniques
[NASA-CR-169642] p 60 N83-14878

METAL SURFACES

- Polymers metallic electrodes for rechargeable battery applications p 160 A83-11813

METALLIZING

- Cell and module formation research area p 41 N83-10522

- Project analysis and integration area p 41 N83-10524

- The effect of Ta₂O₅ on the interaction between silicon and its contact metallization
[NASA-TM-82948] p 45 N83-10554

- Development of an all-metal thick film cost effective metallization system for solar cells
[NASA-CR-169635] p 59 N83-14874

- Development of technique for AR coating nickel and copper metallization of solar cells FPS project product development
[NASA-CR-169616] p 60 N83-14879

- Lift off. A very fine front metallization geometry technique for high efficiency solar cells p 62 N83-14701

METALLURGY

- Metallurgy of rechargeable hydrides p 160 A83-11509

METEORITIC COMPOSITION

- Refractory residues, condensates and chondrules from solar furnace experiments p 31 A83-15371

METEOROLOGICAL PARAMETERS

- Climatic aspects of planning impoundments and hydropower operations p 89 N83-12754

- The wind characteristics program p 111 N83-15910

METEOROLOGICAL SERVICES

- The climate of Africa, including feasibility study of climate alert system p 170 N83-12737

METHANATION

- Experiments on the ADAM 1 plant for the optimization of methanization process in the long distance nuclear energy transmission system test run performed in the spring of 1980

- [BLL-T5869/BG/MRS14614/82] p 85 N83-10495

- Microbiological studies towards optimization of methane from marine plant biomass

- [PB82-214362] p 92 N83-10756

METHANE

- Liquid-vapor equilibrium for ternary natural gas system
[PB82-227679] p 82 N83-10160

- Studies related to the deep earth gas
[PB82-227653] p 84 N83-10213

- Membrane controlled anaerobic digestion p 85 N83-10497

- Solid waste to methane gas (RefCOM) p 88 N83-10584

- Water hyacinth wastewater treatment system p 88 N83-10586

- Demonstration of landfill gas enhancement techniques in landfill simulators p 88 N83-10594

- Research, development and demonstration in the design of sanitary landfill to optimize the generation and capture of compressible gas p 89 N83-10595

- Landfill gas recovery. An analysis of results p 89 N83-10596

- Geologic studies of geopressured and hydrogeopressured zones in Texas. Test well site selection
[PB82-220542] p 94 N83-11653

- Phase equilibrium studies for methane/synthesis gas separation. The hydrogen-carbon monoxide-methane system

- [PB82-200637] p 95 N83-12208

- Assessment of research and development needs for methane fueled engine systems
[PB82-199035] p 97 N83-12257

- Fluidized-bed pyrolysis of oil shale. Oil yield, composition, and kinetics
[DE82-021010] p 97 N83-12571

- Methane hydrate gas production. Evaluating and exploiting the solid gas resource
[DE82-004373] p 110 N83-15488

METHYL ALCOHOLS

- Ocean thermal energy at the Johns Hopkins University Applied Physics Laboratory

- [PB82-215054] p 122 N83-10639

- Performance and emissions characteristics of aqueous alcohol fumes in a DI diesel engine

- [NASA-CR-187917] p 96 N83-12250

- Status of alcohol-fuels-utilization technology for highway transportation. A 1981 perspective. Volume 1. Spark-ignition engines

- [DE82-020493] p 96 N83-12255

- Coal to methanol feasibility study: Beluga methanol project. Volume 4. Environmental

- [DE82-006057] p 10 N83-12542

MICROANALYSIS

- Microstructural analysis of solar cell welds p 72 N83-15833

- Evaluation of solar cell welds by scanning acoustic microscopy p 72 N83-15834

MICROBIOLOGY

- Microbiological studies towards optimization of methane from marine plant biomass

- [PB82-214362] p 92 N83-10756

MICROPROCESSORS

- Microprocessor control of power sharing and solar array peak power tracking for high power /2.5 kW/ switching power converters p 23 A83-11007

- Controlling energy consumption in single buildings
[AD-A118898] p 19 N83-14739

MICROSTRUCTURE

- Zinc electrode morphology in alkaline solutions. I - Study of alternating voltage modulation on a rotating disk electrode p 115 A83-15887

- Interaction of electromagnetic radiation and microstructural materials with regard to the production of spectral-selective solar absorbers - German thesis

- p 37 A83-18497

- Microstructure of coal p 87 N83-10576

- Microstructural analysis of solar cell welds p 72 N83-15833

- Structural characterization of materials for high energy space systems p 171 N83-15883

MICROWAVE COUPLING

- Measurements of energy distribution and thrust for microwave plasma coupling of electrical energy to hydrogen for propulsion

- [AIAA PAPER 82-1851] p 75 A83-12508

MICROWAVE OSCILLATORS

- A relativistic plasma microwave generator p 115 A83-15909

MIDDLE ATMOSPHERE

- The satellite power system - Assessment of the environmental impact on middle atmosphere composition and on climate p 2 A83-14517

MINERAL DEPOSITS

- Hydrogeochemical and stream-sediment reconnaissance basic data for Marion, Canton, Pittsburgh and Cleveland quadrangles, Ohio, West Virginia, Pennsylvania Uranium Resource Evaluation Project

- [DE82-020430] p 102 N83-13553

- Hydrogeochemical and stream-sediment reconnaissance basic data for Ogdensburg and Lake Champlain quadrangles, New York, Vermont Uranium Resource Evaluation Project

- [DE82-020417] p 102 N83-13557

- Hydrogeochemical and stream-sediment reconnaissance basic data for Jenkins Quadrangle, Kentucky, Virginia, West Virginia Uranium resource evaluation project

- [DE82-020431] p 102 N83-13558

- Geochemical studies of cores from the San Juan Basin Research Site, Grants Uranium Region, New Mexico

- [DE82-004153] p 108 N83-14795

MINERAL EXPLORATION

- Remote sensing and uranium exploration at Lisbon Valley, Utah p 77 A83-10032

MINES (EXCAVATIONS)

- Computerized, remote monitoring systems for underground coal mines. Fires and explosive atmospheres

- [PB82-221359] p 3 N83-10481

- Evaluation of the Kioswall longwall mining system
[DE82-015881] p 89 N83-10606

- Assessment of alternative power sources for mobile mining machinery
[NASA-TM-82695] p 136 N83-14691

MINIATURIZATION

- Miniaturized Cassegrainian concentrator concept demonstration p 71 N83-15830

MINING

- Development, construction, and experimental operation of an improved chainless haulage system for drum-shearer loaders

- [BMFT-FB-T-82-102] p 158 N83-10428

- Resource targets for advanced underground coal extraction systems
[NASA-CR-169429] p 85 N83-10503

- Evaluation of the Kioswall longwall mining system
[DE82-015881] p 89 N83-10606

- Pneumatic stowing with lateral discharge in coal faces with thick seams

- [BMFT-FB-T-82-074] p 90 N83-10617

- Coal to methanol feasibility study. Beluga methanol project. Volume 4: Environmental

- [DE82-006057] p 10 N83-12542

- Evaluation of a sheathed permissible explosive charge for open shooting in flammable atmospheres. Adobe charge program

- [PB82-220732] p 103 N83-13636

- Numerical simulation of fluid flow in porous/fractured media
[DE82-002631] p 107 N83-14454

- Automatic interpretation of MSS-LANDSAT data applied to coal refuse site studies in southern Santa Catarina State, Brazil

- [E83-10066] p 18 N83-14575

- Longwall shearer tracking system
[NASA-CASE-MFS-25717-1] p 107 N83-14607

- Assessment of alternative power sources for mobile mining machinery
[NASA-TM-82695] p 136 N83-14691

- Study of the freezing pressure acting on a shaft lining p 110 N83-15732

MINORITY CARRIERS

- Optical absorption coefficient and minority carrier diffusion length measurements in low-cost silicon solar cell material p 30 A83-13922

- New silicon cell design concepts for 20 percent AMI efficiency p 68 N83-15808

- Diffusion length measurements in solar cells. An analysis and comparison of techniques p 69 N83-15812

MIRROR FUSION

- Stability and disturbance of large dc superconducting magnets
[DE82-012388] p 122 N83-10879

- Technology spin-offs from the magnetic fusion energy program
[DE82-016923] p 123 N83-10887

- Feasibility study of a fission-suppressed tandem-mirror hybrid reactor
[DE82-019375] p 134 N83-13997

- Utilizing subcooled, superfluid He-II in the design of a 12-Tesla tandem-mirror experiment
[DE82-003322] p 138 N83-15133

- Designs of tandem-mirror fusion reactors
[DE82-000845] p 138 N83-15134

- Magnet and conductor developments for the mirror fusion program
[DE82-001062] p 139 N83-15136

- ELMO Bumpy Torus fusion-reactor design study
[DE82-002388] p 154 N83-16218

- The MFTF-B plasma diagnostic system
[DE82-002594] p 155 N83-16228

- Stabilization of axisymmetric mirror plasma by energetic ion injections
[DE81-030341] p 155 N83-16229

MIRRORS

- A study of silicon and GaAs solar cells, and their optical coupling by means of a dichroic mirror - French thesis
p 23 A83-11764

- Operational considerations on the moon-day project
p 38 A83-19148

- Solar hemispherical reflectometer modification for second-surface mirror measurement
[DE82-016913] p 47 N83-10610

- Neutron attenuation in the laser ducts of an inertial-confinement fusion reactor
[DE82-007195] p 126 N83-10947

- Volatile production during preignition heating
[DE82-003061] p 109 N83-15402

MIS (SEMICONDUCTORS)

- On the open-circuit voltage of a Schottky-barrier MIS solar cell p 36 A83-17770

- Research and development on a MIS thin film solar cell made of amorphous silicon
[BMFT-FB-T-82-079] p 47 N83-10620

- Investigation of new solar cells. Part A. Novel semiconductors and their suitability. Part B. Polycrystalline MIS diodes
[BMFT-FB-T-82-103] p 48 N83-10632

MIXING

- Computer modeling of mixing and agglomeration in coal-conversion reactors. Volume 1. Model formulation
[DE82-014836] p 84 N83-10212

MIXTURES

- Tests of blending and correlation of distillate fuel properties p 78 A83-11050

- Potential for use of peat blends with coal for electric power generation
[DE82-003634] p 110 N83-15497

MOBILITY

- Assessment of alternative power sources for mobile mining machinery
[NASA-TM-82695] p 136 N83-14691

MODELS

- Solar availability in cities and towns. A computer model
[PB82-202201] p 49 N83-11608

MODULES

- Testing of the energy module of a parabolocylindrical solar installation p 31 A83-15130

- User handbook for block IV silicon solar cell modules
[NASA-CR-169431] p 45 N83-10552

MOISTURE CONTENT

Module technique of 5 x 5 cm(2) solar cells --- for spacecraft p 62 N83-14698

MOISTURE CONTENT

The heat capacity of coal chars p 83 N83-10206

MOLECULAR THEORY

Computer simulation and molecular theory studies of natural gas mixtures [PB82-22060] p 92 N83-11349

MOLLUSKS

Environmental Research Guiding Committee report [PB82-220070] p 6 N83-10661

MOLTEN SALT ELECTROLYTES

The effect of thickness on the performance of molten carbonate fuel cell cathodes p 115 A83-15869

MOLTEN SALTS

Internal reforming for natural gas fueled molten carbonate fuel cells [PB82-200676] p 128 N83-11607

MOLYBDENUM

Electron impact ionization of highly charged molybdenum impurities in Tokamak plasmas p 151 N83-16119

MOMENTUM THEORY

Momentum theory, dynamic inflow, and the vortex-ring state p 116 A83-16026

MONTE CARLO METHOD

Neutron attenuation in the laser ducts of an inertial-confinement fusion reactor [DE82-007195] p 126 N83-10947

Neutral-beam deposition in large, finite-beta noncircular Tokamak plasmas [DE82-008146] p 127 N83-10957

MOON

Operational considerations on the moon-day project p 38 A83-19148

MOTOR VEHICLES

Assessment of research and development needs for methane fueled engine systems [PB82-199035] p 97 N83-12257

MUD

Improvement of the casing cementation of deep and ultra-deep wells Part 1 Drilling muds and washing fluids [BMFT-FB-T-82-111-PT-1] p 92 N83-11364

MULTIPOLAR FIELDS

Potential ohmic heating in a multipole [DE82-019888] p 134 N83-13998

MX MISSILE

Configuration selection study for isolated loads using parabolic dish modules p 45 N83-10548

N

N-TYPE SEMICONDUCTORS

Process for high photocurrent in IBC solar cells --- Interdigitated Back Contact p 24 A83-12059

Electrochemical storage cell based on polycrystalline silicon [DE82-020595] p 56 N83-13600

Advances in large-diameter liquid encapsulated Czochralski GaAs p 70 N83-15819

NASA PROGRAMS

The NASA Redox Storage System Development project, 1980 [NASA-TM-82940] p 166 N83-14683

NASA space photovoltaic research and technology programs p 64 N83-14713

NATURAL GAS

Case for a Space Center in the Arabian Gulf p 2 A83-18812

Liquid-vapor equilibrium for ternary natural gas system [PB82-227679] p 82 N83-10160

Studies related to the deep earth gas [PB82-227653] p 84 N83-10213

Application of the subatmospheric engine to solar thermal power p 45 N83-10546

The development of a geopressured energy management information system in support of research planning, phase 1 [PB82-207366] p 91 N83-10638

Computer simulation and molecular theory studies of natural gas mixtures [PB82-22060] p 92 N83-11349

Internal reforming for natural gas fueled molten carbonate fuel cells [PB82-200676] p 128 N83-11607

Cogeneration Energy Systems assessment. Volume 2 Technical discussion [PB82-200692] p 8 N83-11609

Technology and Soviet energy availability: Summary [OTA-ISC-154] p 13 N83-13584

Hydrogen recovery from supplemented natural gas by metal hydrides [DE82-002245] p 76 N83-14303

Physical and chemical characterization of devonian gas shale [DE82-002560] p 111 N83-15802

NATURAL GAS EXPLORATION

Exploration for fractured petroleum reservoirs using radar/Landsat merge combinations p 77 A83-10031

Landsat for resource evaluation and management in the Alberta foothills p 80 A83-14256

Geological studies of the COST numbers G-1 and G-2 wells, United States north Atlantic outer continental shelf [USGS-CIRC-661] p 94 N83-11638

Remote sensing applications to the development of an integrated data base for oil and gas exploration p 107 N83-14628

NAVIER-STOKES EQUATION

Coupled three-dimensional flow and electrical calculations for Faraday MHD generators p 117 A83-16107

NEUTRAL BEAMS

Fusion Energy Division automation of the ISX-B neutral beams [DE82-016369] p 132 N83-13008

Lawrence Berkeley Laboratory neutral-beam engineering test facility power-supply system [DE82-003044] p 137 N83-15104

Deuterium flux measurements in the edge plasmas of PLT and PDX during auxiliary heating experiments [DE82-001909] p 139 N83-15143

NEUTRON FLUX DENSITY

Neutron attenuation in the laser ducts of an inertial-confinement fusion reactor [DE82-007195] p 126 N83-10947

NEUTRON SOURCES

Development of current sheet on output of coaxial gun p 152 N83-16125

NEUTRON SPECTRA

A time resolving method for determining the energy spectrum of neutrons emitted by a plasma focus device p 153 N83-16133

NEUTRONS

ORNL integral experiment to provide data for evaluating magnetic-fusion-energy shielding concepts Part 1 Attenuation measurements [DE82-019775] p 135 N83-13999

NEVADA

Preliminary plan for the development of geothermal energy in the town of Hawthorne, Nevada [DE82-904440] p 14 N83-13620

Preliminary plan for the development of geothermal energy in the town of Gabbs, Nevada [DE82-904441] p 15 N83-13621

NEW YORK

Wood Road School, Ballston Spa, New York solar-energy-system performance evaluation, November 1981 - April 1982 [DE82-021301] p 54 N83-12586

Hydrogeochemical and stream-sediment reconnaissance basic data for Utica quadrangle, New York [DE82-020429] p 102 N83-13552

Hydrogeochemical and stream-sediment reconnaissance basic data for Ogdensburg and Lake Champlain quadrangles, New York, Vermont Uranium Resource Evaluation Project [DE82-020417] p 102 N83-13557

NICKEL ALLOYS

Stress-corrosion studies in coal-liquefaction environments [DE82-001464] p 100 N83-13240

NICKEL CADMIUM BATTERIES

Deep discharge reconditioning and shored storage of batteries --- nickel cadmium batteries [NASA-CR-167953] p 120 N83-10502

OAO-3 end of mission power subsystem evaluation [NASA-TM-83959] p 161 N83-11580

NICKEL COATINGS

Development of technique for AR coating nickel and copper metallization of solar cells FPS project product development [NASA-CR-169616] p 60 N83-14679

NICKEL COMPOUNDS

Particle size distribution of Ni microprecipitates in LaNi5 used for hydrogen storage p 75 A83-12295

Research on oxidation by air and tempering of Raney nickel electrocatalysts for the H2 anodes of alkali combustion materials cells --- German thesis p 119 A83-18494

Electrochemical determination of Gibbs energies of formation of cobalt and nickel sulfides [PB82-177304] p 119 N83-10159

NICKEL HYDROGEN BATTERIES

Pore size engineering applied to starved electrochemical cells and batteries [NASA-TM-82893] p 119 N83-10134

NICKEL OXIDES

Polyvinyl alcohol membranes as alkaline battery separators [NASA-TM-82961] p 119 N83-10135

NICKEL ZINC BATTERIES

Zinc electrode morphology in alkaline solutions I - Study of alternating voltage modulation on a rotating disk electrode p 115 A83-15867

Development of a high-rate insoluble zinc electrode for alkaline batteries [DE82-020608] p 162 N83-12572

Technology-base research project for electrochemical storage report for 1981 [DE82-020599] p 163 N83-12573

NICKEL-IRON BATTERIES

Research, development and demonstration of nickel-iron batteries for electric-vehicle propulsion [DE82-021216] p 163 N83-12582

Annual synopsis of Argonne's aqueous battery support research, fiscal year 1981 [DE82-021143] p 163 N83-12583

NIGHT SKY

Operational considerations on the moon-day project p 38 A83-19148

NITRIDING

The fabrication and evaluation of a silicon photovoltaic cell with a directly nitrided tunnel insulator p 45 N83-10564

NITROGEN

Liquid-vapor equilibrium for ternary natural gas system [PB82-227679] p 82 N83-10160

Development of criteria for extension of applicability of low-emission, high-efficiency coal burners [PB82-197153] p 93 N83-11377

NITROGEN DIOXIDE

Solar energy storage by the reversible reaction - N2O4 yields 2NO2 - Theoretical and experimental results p 37 A83-18554

Evaluation of short-term NO2 plume models for point sources Volume 1 Technical discussion [PB82-234329] p 16 N83-13658

NITROGEN OXIDES

NOx results from two combustors tested on medium BTU coal gas p 78 A83-11493

NOx formation experiments in an MHD simulation facility p 116 A83-16103

Evaluation of advanced combustion concepts for dry NO sub x suppression with coal-derived, gaseous fuels [NASA-TM-82985] p 85 N83-10557

Multifuel evaluation of rich/lean/lean combustor [NASA-TM-82986] p 86 N83-10559

NO sub x emission control for heavy duty vehicles Toward meeting a 1986 standard [PB82-183880] p 7 N83-10665

Laboratory research for desulfurizing and NO-reduction by addition of ammonia under the conditions of the Bergbau-Forschung flue gas desulfurizing process [BMFT-FB-T-82-147] p 9 N83-11617

Impact of NOx selective catalytic reduction processes on flue gas cleaning systems [PB82-240086] p 16 N83-13664

Environmental assessment of stationary source NOx control technologies [PB82-249350] p 16 N83-13665

NITROUS OXIDES

Design of a low emission combustor for an automotive gas turbine [AIAA PAPER 83-0338] p 117 A83-16664

Solar energy storage by the reversible reaction - N2O4 yields 2NO2 - Theoretical and experimental results p 37 A83-18554

NOISE REDUCTION

Cleaning up the environment Progress achieved but major unresolved issues remain [GAO/CED-82-72] p 19 N83-14767

NOISE SPECTRA

Analysis of combustion spectra containing organ pipe tone by cepstral techniques [NASA-TM-83034] p 77 N83-16153

NOMOGRAPHS

Simplified solar fraction estimation for space and water heating at Department of Defense installations Appendix C Water heating nomographs [AD-A120014] p 73 N83-15904

Simplified solar fraction estimation for space and water heating at Department of Defense installations Appendix B Space heating nomographs [AD-A120013] p 73 N83-15905

Simplified solar fraction estimation for space and water heating at Department of Defense installations [AD-A120012] p 74 N83-15906

NONEQUILIBRIUM CONDITIONS

Helium population model p 154 N83-16139

NONEQUILIBRIUM PLASMAS

Diagnostics of nonequilibrium hydrogen plasma p 153 N83-16135

NONLINEAR SYSTEMS

Resistive MHD studies of high-beta Tokamak plasmas
[DE82-008101] p 126 N83-10942

NONLINEARITY

Short wavelength lower hybrid waves nonlinearly excited due to ponderomotive density modulation
p 151 N83-16118

NONUNIFORM PLASMAS

Computational model of a diffuse discharge on electrodes in a weakly ionized plasma
p 114 A83-11952
Emission characteristics of refractory materials — as electrodes in aerodynamic generators
p 116 A83-16019
Numerical simulation of the interaction of an electromagnetic wave with an inhomogeneous plasma
p 154 N83-16140

NONUNIFORMITY

Study of the freezing pressure acting on a shaft lining
p 110 N83-15732

NUCLEAR AUXILIARY POWER UNITS

Nuclear energy in space p 113 A83-11837

NUCLEAR DEVICES

Energy and technology review
[DE82-019371] p 137 N83-14747

NUCLEAR ELECTRIC POWER GENERATION

Nuclear energy in space p 113 A83-11837

NUCLEAR ELECTRIC PROPULSION

Nuclear energy in space p 113 A83-11837

NUCLEAR EXPLOSIONS

Seismology, 1981, nuclear test ban verification
Earthquake and Earth resource investigation
[FOA-C-20460-T1] p 104 N83-13695

NUCLEAR FUEL ELEMENTS

Overview of high-temperature materials for high-energy space power systems p 144 N83-15869
Nuclear fuel systems for space power application
p 144 N83-15871

NUCLEAR FUELS

Technology and Soviet energy availability: Summary
[OTA-ISC-154] p 13 N83-13584
Nuclear fuel cycle and waste management in France
[DE81-700732] p 104 N83-13975
Laser-isotope-separation technology
[DE81-030114] p 104 N83-14197
Advanced fuel concepts and applications
[DE82-002710] p 137 N83-15110
The MHD disk generator as a multimewatt power supply operating with chemical and nuclear sources
p 141 N83-15848
Overview of high-temperature materials for high-energy space power systems p 144 N83-15869
Nuclear fuel systems for space power application
p 144 N83-15871

NUCLEAR FUSION

Stability and disturbance of large dc superconducting magnets
[DE82-012388] p 122 N83-10879
US-Japan Joint Institute for Fusion Theory Workshop on Nonequilibrium Statistical Physics Problems in Fusion Plasmas: Stochasticity and Chaos
[IPPJ-587] p 123 N83-10920
US-Japan Joint Institute for Fusion Theory Workshop on Equilibrium, Stability and Transport of Nonaxisymmetric Systems
[IPPJ-577] p 124 N83-10922
Fusion research at ORNL
[DE82-017766] p 134 N83-13994
Assessment of some of the problems in the USA of superconducting magnets for fusion research
[DE82-003066] p 137 N83-15111
Heavy-ion inertial fusion: Initial survey of target gain versus ion-beam parameters
[DE82-003069] p 138 N83-15117
Particle-beam fusion
[DE82-003107] p 138 N83-15118
Fusion materials: Adapting to realistic reactor environments
[DE82-002708] p 138 N83-15132
Analytical and numerical calculations of field-reversed Theta-pinch equilibria based on a generalized Hill's vortex model
[DE82-003150] p 139 N83-15139
High-current pulses from inductive energy stores
[DE82-004366] p 187 N83-15587
Physics (selected articles)
[AD-A119830] p 154 N83-16143
Stabilization of axisymmetric mirror plasma by energetic ion injections
[DE81-030341] p 155 N83-16229

NUCLEAR HEAT
Steam gasification of coal, project prototype plant nuclear process heat. Report at the end of the reference phase
[BMFT-FB-T-82-069] p 90 N83-10616

Prototype plant for Nuclear Process Heat (NPH), reference phase R and D work on Hydrogenated Coal Gasification (HCG). Further operation of semi-industrial plant for hydrogenated coal gasification
[BMFT-FB-T-82-098] p 90 N83-10625

NUCLEAR MODELS

Helium population model p 154 N83-16139

NUCLEAR POWER PLANTS

Population hazards resulting from the combustion of fossil fuels and the nuclear power industry
[BLL-RISLEY-TR-4173-(9091 9)] p 11 N83-12594

NUCLEAR PUMPED LASERS

Status, research requirements and potential applications for nuclear pumped lasers p 143 N83-15862

NUCLEAR PUMPING

Status, research requirements and potential applications for nuclear pumped lasers p 143 N83-15862

NUCLEAR REACTOR CONTROL

Curvilinear coordinates for magnetic confinement geometries
[DE82-019733] p 124 N83-10928

NUCLEAR REACTORS

Experiments on the ADAM 1 plant for the optimisation of methanization process in the long distance nuclear energy transmission system test run performed in the spring of 1980
[BLL-T5869/BG/MRS14614/82] p 85 N83-10495
Radial effects in heating and thermal stability of a sub-ignited Tokamak
[DE82-009384] p 124 N83-10932
Neutron attenuation in the laser ducts of an inertial-confinement fusion reactor
[DE82-007195] p 126 N83-10947
Some material implications of space nuclear reactors (non-fuel materials) p 170 N83-15870
Nuclear fuel systems for space power application
p 144 N83-15871
Global model of a hybrid Tokamak reactor with an auxiliary RF heating p 153 N83-16137

NUCLEAR ROCKET ENGINES

Nuclear energy in space p 113 A83-11837

NUCLEATE BOILING

Stability and disturbance of large dc superconducting magnets
[DE82-012388] p 122 N83-10879

NUMERICAL CONTROL

Microprocessor control of power sharing and solar array peak power tracking for high power /2.5 kW/ switching power converters p 23 A83-11007
Power conditioning in an autonomous system controlled by a microprocessor: Simulation of use with a photovoltaic generator — French thesis p 30 A83-13807
Automated probe microdistillation/mass spectrometry for the analysis of high-molecular weight compounds in fossil fuels
[PB82-022039] p 95 N83-12202
Controlling energy consumption in single buildings
[AD-A118898] p 19 N83-14739

NUMERICAL FLOW VISUALIZATION
Investigation of free-forced convection flows in cavity-type receivers
[DE82-020118] p 49 N83-12386

O

OAO 3

OAO-3 end of mission power subsystem evaluation
[NASA-TM-83959] p 161 N83-11580

OCEAN BOTTOM

Understanding the Arctic Sea floor for engineering purposes
[AD-A119773] p 108 N83-14877

OCEAN CURRENTS

Preliminary analysis of wave energy conversion at an offshore structure
[AD-A120079] p 146 N83-15903

OCEAN SURFACE

Experimental feasibility of the airborne measurement of absolute oil fluorescence spectral conversion efficiency
p 169 A83-18581

OCEAN THERMAL ENERGY CONVERSION

Ocean thermal energy at the Johns Hopkins University Applied Physics Laboratory
[PB82-215054] p 122 N83-10639

OCEANOGRAPHIC PARAMETERS

The 100 days of Seasat-A p 78 A83-10115

OCEANS

National Marine Pollution Program Plan: Federal plan for ocean pollution research, development and monitoring. Fiscal years, 1981 - 1985
[PB82-218462] p 6 N83-10656
Coal fly ash disposal in the ocean. An alternative worth considering
[DE82-003835] p 20 N83-14781

OFFSHORE ENERGY SOURCES

Estimation of wave power potential along the Indian coastline p 80 A83-17849
Southern California offshore air quality model validation study: Volume 1: Executive summary — oil exploration pollution impact
[PB82-190711] p 9 N83-11631
Southern California offshore air quality model validation study: Volume 2: Synthesis of findings
[PB82-190729] p 9 N83-11632
An efficient fully implicit simulator
[CSS-126] p 109 N83-15322

OFFSHORE PLATFORMS
The use of buoyancy to lift heavy objects from the sea
[AD-A119320] p 106 N83-14306
Preliminary analysis of wave energy conversion at an offshore structure
[AD-A120079] p 146 N83-15903

OHIO

Hydrogeochemical and stream-sediment reconnaissance basic data for Manon, Canton, Pittsburgh and Cleveland quadrangles, Ohio, West Virginia, Pennsylvania: Uranium Resource Evaluation Project
[DE82-020430] p 102 N83-13553

OHMIC DISSIPATION

Polyoidal ohmic heating in a multipole
[DE82-019888] p 134 N83-13998

OIL EXPLORATION

Applications of remote sensing to petroleum exploration p 77 A83-10030
Exploration for fractured petroleum reservoirs using radar/Landsat merge combinations p 77 A83-10031
Environmental monitoring of the Athabasca Oil Sands Region p 80 A83-14238
Landsat for resource evaluation and management in the Alberta foothills p 80 A83-14256
Southern California offshore air quality model validation study: Volume 1: Executive summary — oil exploration pollution impact
[PB82-190711] p 9 N83-11631
Southern California offshore air quality model validation study: Volume 2: Synthesis of findings
[PB82-190729] p 9 N83-11632
Geological studies of the COST numbers G-1 and G-2 wells, United States north Atlantic outer continental shelf
[USGS-CIRC-861] p 94 N83-11638
Remote sensing applications to the development of an integrated data base for oil and gas exploration
p 107 N83-14628

OIL FIELDS

Exploration for fractured petroleum reservoirs using radar/Landsat merge combinations p 77 A83-10031
Case for a Space Center in the Arabian Gulf
p 2 A83-18812
Critical relationships for displacement processes in oil fields
[BMFT-FB-T-82-093] p 84 N83-10479
National Marine Pollution Program Plan: Federal plan for ocean pollution research, development and monitoring. Fiscal years, 1981 - 1985
[PB82-218462] p 6 N83-10656
Technology and Soviet energy availability: Summary
[OTA-ISC-154] p 13 N83-13584
An efficient fully implicit simulator
[CSS-126] p 109 N83-15322

OIL POLLUTION

Arctic terrestrial environment research programs of the Office of Energy Research, Department of Energy: Evaluation and recommendations
[PB82-197088] p 9 N83-11634
Background levels and environmental cycling of petroleum hydrocarbons: Multimedia monitoring requirements p 11 N83-12630
Effects of oil on tundra ponds and streams
[DE82-018899] p 15 N83-13649

OIL RECOVERY

Critical relationships for displacement processes in oil fields
[BMFT-FB-T-82-093] p 84 N83-10479
Development of new and improvement of existing core recovery methods
[BMFT-FB-T-82-091] p 91 N83-10705
Arctic terrestrial environment research programs of the Office of Energy Research, Department of Energy: Evaluation and recommendations
[PB82-197088] p 9 N83-11634
Chemicals enhanced oil recovery
[DE82-003475] p 105 N83-14206
Design and feasibility study for a portable oil recovery turbopump
[NASA-CR-170704] p 110 N83-15628
Contracts for field projects and supporting research on enhanced oil recovery and improved drilling technology
[DE82-002598] p 111 N83-15803

OIL SLICKS

OIL SLICKS

Experimental feasibility of the airborne measurement of absolute oil fluorescence spectral conversion efficiency p 169 A83-18581

OILS

Chemicals enhanced oil recovery [DE82-003475] p 105 N83-14206

OLIVINE

Evaluation of olivine ceramic refractones for thermal-energy-storage application [DE82-000108] p 168 N83-15947

ONBOARD DATA PROCESSING

AO-3 end of mission power subsystem evaluation [NASA-TM-83959] p 161 N83-11580

ONE DIMENSIONAL FLOW

Techniques for the solution of MHD generator flows [AIAA PAPER 83-0485] p 118 A83-17928

OPEN CIRCUIT VOLTAGE

Planar multijunction high voltage solar cell chip p 30 A83-13923

Theory of open circuit photo-voltage in degenerate abrupt p-n junctions p 36 A83-17767

On the open-circuit voltage of a Schottky-barrier MIS solar cell p 36 A83-17770

OPERATING COSTS

PV large systems project p 40 N83-10512

Vehicle characterization for the TAPCUT Project Performance and cost [DE82-019772] p 13 N83-13465

OPERATING TEMPERATURE

Solar cell having improved back surface reflector [NASA-CASE-LEW-13620-1] p 55 N83-13579

OPTICAL COUPLING

A study of silicon and GaAs solar cells, and their optical coupling by means of a dichroic mirror — French thesis p 23 A83-11764

OPTICAL FILTERS

Interaction of electromagnetic radiation and microstructural materials with regard to the production of spectral-selective solar absorbers — German thesis p 37 A83-18497

OPTICAL MEASURING INSTRUMENTS

General contamination criteria for optical surfaces — instrument performance losses in spaceborne conditions p 29 A83-13743

Remote sensing of coal-fired MHD by optical diagnostic techniques [AIAA PAPER 83-0469] p 80 A83-16736

OPTICAL PROPERTIES

Solar cell device physics — Book p 27 A83-13501

Optimization of parabolic trough solar collectors p 29 A83-13699

The optical properties of titanium nitrides and carbides Spectral selectivity and photothermal conversion of solar energy p 33 A83-15490

On the properties of the superplastic aluminum-calcium alloy as material for solar collectors p 34 A83-15496

An investigation of deposition parameter dependence of optical properties, microstructure and thermal stability of black chrome selective surfaces p 34 A83-15497

OPTICAL PUMPING

A proposed optical pumping system requiring no electric power p 143 N83-15881

OPTICAL RADAR

Experimental feasibility of the airborne measurement of absolute oil fluorescence spectral conversion efficiency p 169 A83-18581

The Doublet III Thomson-scattering-system hemiconcentric triplet lens [DE82-017384] p 123 N83-10908

OPTICAL REFLECTION

Reflections on solar collectors at elevated temperatures /260-1000 C/ — French thesis p 23 A83-11766

OPTICAL TRACKING

Longwall shearer tracking system [NASA-CASE-MFS-25717-1] p 107 N83-14607

OPTIMAL CONTROL

Estimation of aircraft fuel consumption p 1 A83-10186

OPTIMIZATION

On the optimization of magnetic field sources in electromechanical energy conversion p 112 A83-10641

Multivariable stability-margin optimisation with decoupling and output regulation p 2 A83-18191

Optimal sizing of heating systems that store and use thermal energy [DE82-003011] p 164 N83-13609

Optimization of silicon solar cells for solar generators with concentration p 83 N83-14707

ORBIT TRANSFER VEHICLES

Interaction between the SPS solar power satellite solar array and the magnetospheric plasma p 73 N83-15888

ORGANIC COMPOUNDS

Development of newer methods for the isolation and identification of certain components found in complex mixtures derived from energy sources and the determination of their toxicity via bioassay systems [DE82-019043] p 81 N83-10140

Analysis of treated sludges and associated leachates from coal-conversion facilities [DE82-001488] p 103 N83-13650

Sampling for high-molecular-weight organic compounds in power plant stack gases [PB82-234618] p 16 N83-13659

Pyrolysis of organic compounds containing long unbranched alkyl groups [AD-A119749] p 104 N83-14165

Primary lithium organic electrolyte battery BA-5588 [AD-A120858] p 146 N83-15900

ORGANIC SULFUR COMPOUNDS

A systematic investigation of the organosulfur components in coal p 86 N83-10575

ORGANOMETALLIC COMPOUNDS

Metal chelate catalysts for fuel cells [PB82-195837] p 131 N83-12592

Progress toward cascade cells made by OM-VPE — organometallic vapor phase epitaxy p 69 N83-15813

OSMOSIS

Fully controllable heat pipe containing a short electro-osmotic pumping section [AIAA PAPER 83-0317] p 157 A83-16647

OUTPUT

Estimated capacity of US ethanol plants [PB82-203647] p 82 N83-10154

OXIDATION

Research on oxidation by air and tempering of Raney nickel electrocatalysts for the H₂ anodes of alkali combustion materials cells — German thesis p 119 A83-18494

Methods of reducing energy consumption of the oxidant supply system for MHD/steam power plants [NASA-TM-83025] p 133 N83-13589

Development of technique for AR coating nickel and copper metallization of solar cells FPS project product development [NASA-CR-169616] p 60 N83-14679

OXIDATION RESISTANCE

Sol-gel protective coatings for black chrome solar selective films [DE82-004138] p 74 N83-15942

OXIDE FILMS

Oxygen evolution improvement at a Cr-doped SrTiO₃ photoanode by a Ru-oxide coating p 33 A83-15493

OXIDES

Use of oxide decompositions in advanced thermochemical hydrogen cycles for solar heat sources. Experimental results on the low-temperature reactions for the tricovalent tetraoxide-cobalt monoxide pair [DE82-002390] p 77 N83-15958

OXYGEN

An oxygen flow calorimeter for determining the heating value of kilogram size samples of municipal solid waste p 87 N83-10580

Photosynthetic water splitting [PB82-200684] p 76 N83-12206

Design and preparation of new, highly active Fischer-Tropsch catalysts [DE82-003670] p 105 N83-14202

Microdistribution of oxygen in silicon and its effects on electronic properties p 71 N83-15825

OXYGEN SUPPLY EQUIPMENT

Methods of reducing energy consumption of the oxidant supply system for MHD/steam power plants [AIAA PAPER 83-0468] p 118 A83-16735

OXYHALIDES

Correlation of design with performance of primary lithium-sulfur oxyhalide cells [NASA-CR-169369] p 120 N83-10504

P

P-I-N JUNCTIONS

A p-n heterojunction model for the thin-film CuInSe₂/CdS solar cell p 30 A83-14513

P-N JUNCTIONS

Field ionization of deep levels in semiconductors with applications to Hg/1-x/Cd/x/ Te p-n junctions p 156 A83-16089

Thin film polycrystalline Si p-n junction solar cells with preferential doping p 36 A83-17768

Theory of open circuit photo-voltage in degenerate abrupt p-n junctions p 36 A83-17767

Methods for investigating the properties of polycrystalline silicon p-n junction solar cells p 46 N83-10565

Diffused P+-N solar cells in bulk GaAs p 69 N83-15818

P-TYPE SEMICONDUCTORS

Polycrystalline p-WSe₂ as photocathode in an electrochemical solar cell p 29 A83-13702

Electrochemical storage cell based on polycrystalline silicon [DE82-020595] p 56 N83-13600

Advances in large-diameter liquid encapsulated Czochralski GaAs p 70 N83-15819

PACIFIC ISLANDS

Small-scale energy-technology projects in the Pacific Territories A case-study review [DE82-001338] p 67 N83-14751

PACKAGING

Packaging of radioactive wastes for sea disposal [IAEA-TECDOC-240] p 21 N83-15114

PAKISTAN

Energy for agriculture in Pakistan [IIASA-RR-82-20] p 3 N83-10499

PANELS

Fabrication and development of several heat pipe honeycomb sandwich panel concepts — airframe integrated scramjet engine [NASA-CR-165962] p 170 N83-10379

Space Telescope Solar panel assembly thermal test analysis p 65 N83-14724

PARABOLIC BODIES

Development effort of Sheet Molding Compound (SMC) parabolic trough panels [DE82-000841] p 67 N83-14761

PARABOLIC REFLECTORS

Reflections on solar collectors at elevated temperatures /260-1000 C/ — French thesis p 23 A83-11766

Thermal response of solar receiver aperture plates during sun walk-off [ASME PAPER 82-HT-33] p 25 A83-12791

Optimization of parabolic trough solar collectors p 29 A83-13699

A new evacuated CPC collector tube — Compound Parabolic Concentrator p 37 A83-18558

Studies on radiation intensity distribution in the focus of compound parabolic concentrators p 38 A83-18565

Parabolic Dish Solar Thermal Power Annual Program Review, proceedings [NASA-CR-169365] p 42 N83-10525

Development status of the PDC-1 Parabolic Dish Concentrator p 42 N83-10526

Thin film concentrator panel development p 42 N83-10529

Commercialization of parabolic dish systems p 44 N83-10540

A point focusing collector for an integrated water/power complex p 44 N83-10541

The French thermo-helio-electricity-KW parabolic dish program p 44 N83-10542

Configuration selection study for isolated loads using parabolic dish modules p 45 N83-10548

An economic evaluation of solar energy p 45 N83-10549

Panel discussions Industrial support sector requirements p 4 N83-10550

Designing the manifold piping for parabolic-trough-collector fields [DE82-015998] p 46 N83-10599

Tests with concentrating collectors — construction, evaluation and qualification of parabolic solar absorbers [BMFT-FB-T-82-104] p 47 N83-10626

Structural design considerations for a line-focus reflective module using inexpensive composite materials [DE82-021611] p 54 N83-12587

Contact stresses on a thin plate after large displacements to a full parabolic surface [DE82-005712] p 55 N83-13504

PARABOLOID MIRRORS

Acurex Parabolic Dish Concentrator (PDC-2) p 42 N83-10527

PARAMETER IDENTIFICATION

The theory of aircraft engines — Russian book p 113 A83-10675

Projected temperature dependence of quantum yields for photoreactions involving energy or electron transfer p 37 A83-18559

PARAMETERIZATION

Nonlinear algorithms application to irradiated solar cell parameters evaluation p 62 N83-14700

PARTICLE ACCELERATION

Numerical simulation of collective ion acceleration p 152 N83-16127

PARTICLE ACCELERATOR TARGETS

Study of ion beam-initiated inertial-confinement fusion [DE82-013935] p 124 N83-10931

Heavy-ion inertial fusion Initial survey of target gain versus ion-beam parameters [DE82-003069] p 138 N83-15117

SUBJECT INDEX

PARTICLE ACCELERATORS

- Lawrence Berkeley Laboratory neutral-beam engineering test facility power-supply system [DE82-003044] p 137 N83-15104
Heavy-ion inertial fusion: Initial survey of target gain versus ion-beam parameters [DE82-003069] p 138 N83-15117

PARTICLE BEAMS

- Particle-beam fusion [DE82-003107] p 138 N83-15118

PARTICLE COLLISIONS

- Production and experimental study of the dissipative trapped ion instability p 123 N83-10910

PARTICLE EMISSION

- Characterization of diesel emissions from operation of a light-duty diesel vehicle on alternate source diesel fuels [PB82-234147] p 101 N83-13282

PARTICLE FLUX DENSITY

- Simulation code of relativistic electron beam diodes p 153 N83-16138

PARTICLE SIZE DISTRIBUTION

- Particle size distribution of Ni microprecipitates in LaNi₅ used for hydrogen storage p 75 A83-12295

PARTICLE TRAJECTORIES

- Boiler efficiency and emissions testing using Refuse-Derived Fuel (RDF) and coal [AD-A119291] p 19 N83-14772

PARTICLES

- Particulate processes in pulverized coal flames [DE82-003370] p 76 N83-14204

PASTES

- Development of an all-metal thick film cost effective metallization system for solar cells [NASA-CR-169635] p 59 N83-14674

PATENTS

- Method for depositing an oxide coating [NASA-CASE-LEW-13131-1] p 39 N83-10494

PEAT

- Potential for use of peat blends with coal for electric power generation [DE82-003634] p 110 N83-15497

PENNSYLVANIA

- Hydrogeochemical and stream-sediment reconnaissance basic data for Marion, Canton, Pittsburgh and Cleveland quadrangles, Ohio, West Virginia, Pennsylvania. Uranium Resource Evaluation Project [DE82-020430] p 102 N83-13553

PERFORMANCE PREDICTION

- Analysis of two-phase flow solar collectors with application to heat pumps p 27 A83-13481
Hybrid thermoelectric solar collector design and analysis p 27 A83-13482
A design method for closed loop solar energy systems with concentrating collectors p 28 A83-13583
Optimization of parabolic trough solar collectors p 29 A83-13699
A method of rating solar collectors p 29 A83-13701
General contamination criteria for optical surfaces --- instrument performance losses in spaceborne conditions p 29 A83-13743
The STD/MHD codes - Comparison of analyses with experiments --- MHD generator performance prediction and tests p 116 A83-16105
Mathematical model for the analysis of wind-turbine wakes p 117 A83-16108
A parametric analysis of the performances of a linear collectors' network of a solar power plant p 36 A83-18139
The prediction of the thermal performance of building by the CR-method --- heat storage and transmission [CSIR-BRR-396] p 161 N83-11578

PERFORMANCE TESTS

- Performance of the Wells turbine at starting p 113 A83-10661
Self-annealed ion implanted solar cells p 25 A83-12290
An experimental investigation of a stationary reflector/tracking absorber solar collector at intermediate temperatures p 27 A83-13479
Incident angle modifiers for flat-plate solar collectors - Analysis of measurement and calculation procedures p 27 A83-13480
Testing of the energy module of a paraboloidal solar installation p 31 A83-15130
Commercial Photovoltaics Measurements Workshop, Vail, CO, July 27-29, 1981, Proceedings p 32 A83-15452
Photovoltaic systems measurements - Status and perspectives p 32 A83-15461
Experience with specifications applicable to certification --- of photovoltaic modules for large-scale application p 32 A83-15463
Characteristics of a Savonius windmill power system with a synchronous generator p 115 A83-15787

The STD/MHD codes - Comparison of analyses with experiments --- MHD generator performance prediction and tests p 116 A83-16105

Performance characteristics of the double-wall artery high capacity heat pipe [AIAA PAPER 83-0318] p 157 A83-16648
A new evacuated CPC collector tube --- Compound Parabolic Concentrator p 37 A83-18558
Verification testing of the PKI collector at Sandia National Laboratories, Albuquerque, New Mexico p 43 N83-10534

Recent tests on the Carter small reciprocating steam engines p 43 N83-10536
Modifications and testing of a 4-95 Stirling engine for solar applications p 44 N83-10538
Dish Stirling system integration and test progress report p 44 N83-10539
Ceramic high temperature receiver design and tests p 44 N83-10544

Northern-climate heat-pump field performance evaluation [DE82-905832] p 12 N83-13402
Acceptance-test report for El Toro Library solar heating and cooling demonstration project (SHAC no 1501) [DE82-019859] p 57 N83-13616

PERIODIC VARIATIONS

Telluride School, Telluride, Colorado solar-energy-system performance evaluation, February 1982 - April 1982 p 54 N83-12585
Wood Road School, Ballston Spa, New York solar-energy-system performance evaluation, November 1981 - April 1982 p 54 N83-12586
Use of waste heat in district systems with considerations of seasonal-heat-demand variations [DE82-019923] p 14 N83-13614

PERIODICALS

Authors guide to publishing in the fields of plasma physics and controlled fusion [DE82-002866] p 155 N83-16230

PETROGRAPHY

Petrographic evaluation of pyrite in the products from two-stage coal-pyrite flotation [DE82-003593] p 105 N83-14208

PETROLEUM PRODUCTS

An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil Part 4 Production of samples of military fuels from raw shale oils [AD-A117526] p 83 N83-10211
Potential benefits from a successful solar thermal program p 3 N83-10547
Technology and Soviet energy availability: Summary [OTA-ISC-154] p 13 N83-13584
Program guide to used oil recycling [DOE/CS-40402/1] p 104 N83-14178
Chemicals enhanced oil recovery [DE82-003475] p 105 N83-14206

PETROLOGY

An integrated model for the natural flow regime in the Cerro Prieto hydrothermal system, B.C., Mexico, based upon petrological and isotope geochemical criteria [DE82-001980] p 107 N83-14658

PH

Operation of a steady-state pH-differential water electrolysis cell p 75 A83-16041

PHASE CHANGE MATERIALS

Liquid phase thermochemical energy conversion systems - An application of Diels-Alder chemistry p 118 A83-17149
Development of enhanced heat transfer/transport/storage slurries for thermal-system improvement [DE82-021238] p 158 N83-12387
Mathematical modeling of TES subsystems [DE82-000168] p 168 N83-15950

PHASE SHIFT

Instrument landing system localizer receiver performance in the presence of co-channel interference [AD-A118909] p 99 N83-13089

PHASE TRANSFORMATIONS

Coal gasification of steam-soluted catalyst [BMFT-FB-T-82-073] p 81 N83-10143
Hard coal gasification using catalysts dissolved in steam [BMFT-FB-T-82-107] p 82 N83-10146
Phase equilibrium studies for methane/synthesis gas separation. The hydrogen-carbon monoxide-methane system [PB82-200637] p 95 N83-12208

PHOSPHATES

Layered transition metal thiophosphates /MPX3/ as photoelectrodes in photoelectrochemical cells p 33 A83-15483

PHOTOTHERMAL CONVERSION

PHOSPHORIC ACID FUEL CELLS

On the 40kW test power plant modification and development, phase 2 [PB82-216102] p 122 N83-10637
Cell module and fuel conditioner development [NASA-CR-165462-A] p 130 N83-12524
Develop and test fuel cell powered on-site integrated total energy system [NASA-CR-168020] p 140 N83-15839

PHOTOCATHODES

Polycrystalline p-WSe₂ as photocathode in an electrochemical solar cell p 29 A83-13702

PHOTOCHEMICAL REACTIONS

The satellite power system - Assessment of the environmental impact on middle atmosphere composition and on climate p 2 A83-14517
Projected temperature dependence of quantum yields for photoreactions involving energy or electron transfer p 37 A83-16559
Thermodynamics and photoelectrochemical behavior of the n-TiO₂ electrode in fluoride containing solutions [AD-A119144] p 58 N83-14179

PHOTOCONDUCTIVITY

User handbook for block IV silicon solar cell modules [NASA-CR-169431] p 45 N83-10552
Study of the photovoltaic effect in thin film barium titanate [NASA-CR-169435] p 46 N83-10567

PHOTOCONDUCTORS

Lift off A very fine front metallization geometry technique for high efficiency solar cells p 62 N83-14701

PHOTOELECTRIC EFFECT

The residual voltage in fast electrophotography of a-SiH_x/x p 34 A83-15511

PHOTOELECTROCHEMICAL DEVICES

Transport properties of Nafion membranes for use in three-electrode photoelectrochemical storage cells p 160 A83-12055
Polycrystalline lanthanum rhodate and lutetium rhodate photoelectrodes for liquid junction solar cells p 33 A83-15480
Layered transition metal thiophosphates /MPX3/ as photoelectrodes in photoelectrochemical cells p 33 A83-15483

Influence of deposition rate on the character of electrodeposited CdSe used for photoelectrochemical cells p 34 A83-15499
Electrochemical storage cell based on polycrystalline silicon [DE82-020595] p 56 N83-13600
Thermodynamics and photoelectrochemical behavior of the n-TiO₂ electrode in fluoride containing solutions [AD-A119144] p 58 N83-14179
Fuel and electricity generation from illumination of inorganic interfaces [AD-A118305] p 67 N83-14741

PHOTOMAPPING

Environmental monitoring of the Athabasca Oil Sands using Landsat data p 79 A83-11988
Landsat for resource evaluation and management in the Alberta foothills p 80 A83-14256

PHOTON BEAMS

Electron and photon degradation of boron doped FZ silicon solar cells p 64 N83-14711

PHOTONS

Helium population model p 154 N83-16139

PHOTOOXIDATION

Oxygen evolution improvement at a Cr-doped SrTiO₃ photoanode by a Ru-oxide coating p 33 A83-15493

PHOTORECONNAISSANCE

Landsat for resource evaluation and management in the Alberta foothills p 80 A83-14256

PHOTOSYNTHESIS

Photosynthetic water splitting [PB82-200684] p 76 N83-12206

PHOTOTHERMAL CONVERSION

The optical properties of titanium nitrides and carbides Spectral selectivity and photothermal conversion of solar energy p 33 A83-15490
Production of hydrogen by direct thermal decomposition of water - Preliminary investigations p 75 A83-16042
Hydrogen as a vector for central receiver solar utilities p 75 A83-16044
Evaluation of thermophotovoltaic conversion efficiency p 35 A83-16086
A parametric analysis of the performances of a linear collectors' network of a solar power plant p 36 A83-18139
Parabolic Dish Solar Thermal Power Annual Program Review, proceedings [NASA-CR-169365] p 42 N83-10525
Development status of the PDC-1 Parabolic Dish Concentrator p 42 N83-10526
Acurex Parabolic Dish Concentrator (PDC-2) p 42 N83-10527
The PKI collector p 42 N83-10528

PHOTOVOLTAGES

- Thin film concentrator panel development p 42 N83-10529
- A transmittance-optimized, point-focus Fresnel lens solar concentrator p 42 N83-10530
- The small community solar thermal power experiment p 43 N83-10531
- Development status of the small community solar power system p 43 N83-10532
- Organic Rankine power conversion subsystem development for the small community solar thermal power system p 43 N83-10533

PHOTOVOLTAGES

- Optical absorption coefficient and minority carrier diffusion length measurements in low-cost silicon solar cell material p 30 A83-13922
- Electrophoretic Cds/Cu₂S solar cells for space applications p 63 N83-14704

PHOTOVOLTAIC CELLS

- Exactly soluble model for a solar cell with nonlinear recombination p 24 A83-11811
- Performance characteristics of 350 kW photovoltaic power system for Saudi Arabian villages p 28 A83-13647
- Polycrystalline silicon availability for photovoltaic and semiconductor industries p 28 A83-13648
- Commercial Photovoltaics Measurements Workshop, Vail, CO, July 27-29, 1981, Proceedings p 32 A83-15452

- Use of test structures in the production of CdS/Cu₂S photovoltaic devices p 32 A83-15455
- Large grain polycrystalline silicon from rice husk — for terrestrial solar cells p 33 A83-15492
- The properties and production of solar cells p 35 A83-16183

- Stability of SnO₂ thin films used for photovoltaic devices p 38 A83-18563
- Photovoltaic properties of cadmium sulfide/trivalent-metal phthalocyanine heterojunction devices p 39 A83-19259
- FSAs future role p 39 N83-10507
- Engineering sciences area and module performance and failure analysis area p 41 N83-10523

- User handbook for block IV silicon solar cell modules [NASA-CR-169431] p 45 N83-10552
- Photovoltaic module encapsulation design and materials selection, volume 1, abridged p 45 N83-10553
- [NASA-CR-169372] p 45 N83-10553

- The fabrication and evaluation of a silicon photovoltaic cell with a directly nitrided tunnel insulator p 45 N83-10564
- Design and development of a high-concentration photovoltaic concentrator p 46 N83-10597
- Study of photovoltaic residential retrofits Volume 1 Executive summary p 46 N83-10605

- Intermediate photovoltaic system application experiment operational performance Volume 6 for Lovington Square Shopping Center, Lovington, NM p 47 N83-10608
- Efficiency-improvement study for GaAs solar cells p 48 N83-11585
- Intermediate photovoltaic system application experiment operational performance report Volume 10 Newman Power Station, El Paso, Tex p 48 N83-11588

- Intermediate photovoltaic system application experiment operational performance report. Volume 10 Lovington Square Shopping Center, Lovington, N Mex (USA) p 49 N83-11589
- Intermediate photovoltaic system application experiment operational performance report. Volume 3 Beverly High School, Beverly, Massachusetts p 50 N83-12543

- A survey of spectral response measurements for photovoltaic devices p 50 N83-12545
- J F Long experimental photovoltaic house p 50 N83-12547
- Analysis of small commercial photovoltaic applications p 51 N83-12548
- Data report for the Southwest Residential Experiment Station, Mar 1982 p 52 N83-12556

- Study of photovoltaic residential retrofits Volume 2 Main report p 53 N83-12566
- Electrical aspects of photovoltaic-system simulation p 53 N83-12568
- PV module degradation-analysis p 53 N83-12570
- Pnce estimates for the production of wafers from silicon ingots [NASA-CR-169517] p 55 N83-13583

- Summary of flat-plate solar array project documentation Abstracts of published documents, 1975 to June 1982 [NASA-CR-169518] p 56 N83-13586

- Performance criteria for photovoltaic energy systems, volume 1 p 56 N83-13596
- Performance criteria for photovoltaic energy systems, volume 2 p 56 N83-13597
- Photovoltaic balance-of-system assessment p 57 N83-13622

- Development of photovoltaic array and module safety requirements [NASA-CR-169641] p 60 N83-14681
- Advanced Czochralski silicon growth technology for photovoltaic modules [NASA-CR-169661] p 61 N83-14685
- Heat transparent high intensity high efficiency solar cell [NASA-CASE-LEW-12892-1] p 61 N83-14692

- Photovoltaic Generators in Space — conference [ESA-SP-173] p 61 N83-14694
- NASA space photovoltaic research and technology programs p 64 N83-14713
- Residential photovoltaic experiment station data system p 68 N83-14762

- System analysis, design, construction and commission of a photovoltaic power plant for supply of broadcasting equipment [BMFT-FB-T-82-125] p 68 N83-14763
- The worldwide market for photovoltaics in the rural sector [NASA-TM-83035] p 73 N83-15840

- Flat plate photovoltaic power systems Description, design and cost [AD-A120814] p 73 N83-15902
- PHOTOVOLTAIC CONVERSION**
- On the formula for the upper limit of photovoltaic solar energy conversion efficiency p 23 A83-10699

- Status of new thin-film photovoltaic technologies p 23 A83-11510
- Research on the characteristic parameters of thermophotovoltaic /TPV/ converter performance p 24 A83-12029
- Solar cell device physics — Book p 27 A83-13501

- Power conditioning in an autonomous system controlled by a microprocessor Simulation of use with a photovoltaic generator — French thesis p 30 A83-13807
- A study of different techniques for cooling solar cells in centralized concentrator photovoltaic power plants — French thesis p 30 A83-14109
- A manufacturer's perspective of measurement equipment needs for the photovoltaics industry p 32 A83-15454

- Spectroradiometer measurements in support of photovoltaic device testing p 32 A83-15458
- Photovoltaic systems measurements - Status and perspectives p 32 A83-15461
- Experience with specifications applicable to certification — of photovoltaic modules for large-scale application p 32 A83-15463

- Changes in photovoltaic and dark electrical properties of hydrogenated amorphous silicon diodes induced by forward bias carrier injection p 34 A83-16021
- Evaluation of thermophotovoltaic conversion efficiency p 35 A83-16086
- Photovoltaic prospects in Europe p 35 A83-16184

- Design of electronic optimizer for solar electric drive system p 36 A83-17150
- Development of the spherical silicon solar cell p 36 A83-17347
- Theory of open circuit photo-voltage in degenerate abrupt p-n junctions p 36 A83-17767

- On the open-circuit voltage of a Schottky-barrier MIS solar cell p 36 A83-17770
- Flat Plate Solar Array Project. Proceedings of the 20th Project Integration Meeting [NASA-CR-169370] p 39 N83-10505
- National photovoltaic program p 3 N83-10506
- Advanced Czochralski ingot growth p 40 N83-10509

- Block 5 module design summary p 40 N83-10510
- Central-station applications System and subsystem research activities p 40 N83-10511
- PV large systems project p 40 N83-10512
- Sacramento Municipal Utility District 100-MW sub e photovoltaic plant p 40 N83-10513

- PV history: Lessons for the future p 40 N83-10514
- Rooftop applications p 40 N83-10515
- Photovoltaic research needs industry perspective p 40 N83-10516
- Research possibilities? No! Needs for research to make PV solar energy utilization broadly competitive p 40 N83-10517

- Evaluation of advanced R and D topics in photovoltaics p 41 N83-10518
- Market assessment of photovoltaic power systems for agricultural applications worldwide [NASA-CR-165541] p 56 N83-13585

- Distributed photovoltaic systems Utility interface issues and their present status Intermediate/three-phase systems — power conditioning p 61 N83-14686
- NASA-OAST program in photovoltaic energy conversion p 68 N83-15807
- Flat plate photovoltaic power systems Description, design and cost [AD-A120814] p 73 N83-15902

PHOTOVOLTAIC EFFECT

- Meaning of the photovoltaic band gap for amorphous semiconductors p 25 A83-12287
- Evaluation of electrode shape and nondestructive evaluation method for welded solar cell interconnects [NASA-TM-82966] p 45 N83-10555
- Study of the photovoltaic effect in thin film barium titanate [NASA-CR-169435] p 46 N83-10567

- Intermediate photovoltaic system application experiment operational performance report. Volume 7 Beverly High School, Beverly, Mass p 46 N83-10607
- Data report for the Northeast Residential Experiment Station, May 1982 p 51 N83-12553
- Design and fabrication of a prototype system for photovoltaic residences in the Southwest [DE82-020783] p 51 N83-12554

- Simulation of thermal aspects of residential photovoltaic systems [DE82-020399] p 51 N83-12555
- Intermediate photovoltaic system application experiment operational performance report for CDC Light Manufacturing Building, San Bernardino, California [DE82-020883] p 56 N83-13599

- PHthalocyanine**
- Photovoltaic properties of cadmium sulfide/trivalent-metal phthalocyanine heterojunction devices p 39 A83-19259
- PHYSICAL OPTICS**
- Interaction of electromagnetic radiation and microstructural materials with regard to the production of spectral-selective solar absorbers — German thesis p 37 A83-18497

- PILOT PLANTS**
- Coal preparation and testing p 86 N83-10573
- Prototype plant for Nuclear Process Heat (NPH), reference phase R and D work on Hydrogenated Coal Gasification (HCG) Further operation of semi-industrial plant for hydrogenated coal gasification [BMFT-FB-T-82-098] p 90 N83-10625

- Basic engineering of a 10 t/hr prototype plant for the Vereinigte Elektrizitätswerke Westfalen (VEW) coal conversion process p 101 N83-13378
- Experimental results of a nonconventional energy conversion pilot facility-thermogravimetric system [CISE-1754] p 103 N83-13629
- The experience collected in the management of the Centro Informazioni Studi Esperienze (CISE) radioactive waste from 1960 to 1980 p 17 N83-13977

- Tritium waste control October 1980 - March 1981 [DE82-002088] p 20 N83-14774
- PINCH EFFECT**
- Analytical and numerical calculations of field-reversed Theta-pinch equilibria based on a generalized Hill's vortex model [DE82-003150] p 139 N83-15139

- PIPES (TUBES)**
- A new evacuated CPC collector tube — Compound Parabolic Concentrator p 37 A83-18558
- Determination of friction coefficients on several distant heat pipe sections with different sliding partners — static friction measurement of flat bearings [BMFT-FB-T-82-095] p 158 N83-10397

- Designing the manifold piping for parabolic-trough-collector fields [DE82-015998] p 46 N83-10599
- PISTON ENGINES**
- Recent tests on the Carter small reciprocating steam engines p 43 N83-10536
- A conceptual study of the potential for automotive-derived and free-piston Stirling engines in 30- to 400-kilowatt stationary power applications [NASA-CR-165274] p 121 N83-10568

- PISTONS**
- Gas-to-hydraulic power converter [NASA-CASE-MSC-18794-1] p 136 N83-14693

SUBJECT INDEX

PITCH (INCLINATION)

- Atmospheric testing of a two bladed furl controlled wind turbine with passive cyclic pitch variation p 149 N83-15938

PLANKTON

- Effects of oil on tundra ponds and streams [DE82-018899] p 15 N83-13649

PLANNING

- National Marine Pollution Program Plan. Federal plan for ocean pollution research, development and monitoring Fiscal years, 1981 - 1985 [PB82-218462] p 6 N83-10656
Residential End-use Energy Planning System (REEPS) [DE82-906444] p 14 N83-13619
Energy policy formulation in South Africa. APL as a tool to identify options p 20 N83-14968

PLANT DESIGN

- Modular small hydro configuration [PB82-184953] p 129 N83-12327
Compressed-air energy storage preliminary design and site-development program in an aquifer Volume 1 Executive summary [DE82-019284] p 164 N83-13610

PLASMA COMPRESSION

- Analysis of stabilization effect of quadrupole field on theta pinch plasmas [IPPJ-608] p 131 N83-12995

PLASMA CONDUCTIVITY

- Transport of light-ion beams in plasma channels [DE82-001649] p 139 N83-15140

PLASMA CONTROL

- US-Japan Joint Institute for Fusion Theory Workshop on Nonequilibrium Statistical Physics Problems in Fusion Plasmas Stochasticity and Chaos [IPPJ-587] p 123 N83-10920
US-Japan Joint Institute for Fusion Theory Workshop on Equilibrium, Stability and Transport of Nonaxisymmetric Systems [IPPJ-577] p 124 N83-10922
Study of ion beam-initiated inertial-confinement fusion [DE82-013935] p 124 N83-10931
Sufficient stability condition for alpha-driven velocity-space modes in compression Tokamak [IPPJ-609] p 131 N83-12996
Reduction of neoclassical losses in magnetic-confinement devices [DE82-020277] p 132 N83-13003
Non-circular bumpy torus [IPPJ-607] p 134 N83-13990
Energy and technology review [DE82-019371] p 137 N83-14747
Multidimensional MHD computations for the field-reversed theta pinch and the reversed-field pinch [DE82-004361] p 139 N83-15142
ELMO Bumpy Torus fusion-reactor design study [DE82-002388] p 154 N83-16218
CAMAC based inter-computer communications system [DE82-002879] p 156 N83-16233

PLASMA CURRENTS

- End region effects upon the performance of a magnetohydrodynamic channel p 113 N83-10665
Plasma equilibrium and field diffusion during current rise phase of STP-2 screw pinch Tokamak [IPPJ-594] p 123 N83-10919
Analytical and numerical calculations of field-reversed Theta-pinch equilibria based on a generalized Hill's vortex model [DE82-003150] p 139 N83-15139
Crater formation by high current discharges in vacuum p 152 N83-16129

PLASMA DENSITY

- External ionization mechanisms for advanced thermionic converters p 120 N83-10496
Behavior of a plasma in a high-density gas-embedded Z-pinch configuration [DE82-017396] p 125 N83-10935
Plasma parameter measurements using neutral-particle-beam attenuation [DE82-021120] p 132 N83-13001
Development of current sheath on output of coaxial gun plasma p 152 N83-16125
Dynamical model of an overheated magnetized plasma p 152 N83-16131

PLASMA DIAGNOSTICS

- Toroidal flow coal-fired MHD combustor design study and tests [AIAA PAPER 83-0467] p 118 N83-16734
Measurements of fusion reactions from a Tokamak plasma -- plasma diagnostics p 124 N83-10926
Plasma parameter measurements using neutral-particle-beam attenuation [DE82-021120] p 132 N83-13001
The MFTF-B plasma diagnostic system [DE82-002594] p 155 N83-16228

PLASMA DRIFT

- Instabilities driven by the parallel variation of the electrostatic potential in tandem [DE82-018409] p 126 N83-10941
Observations of plasma rotation in the high-beta Tokamak Torus 2 [DE82-018373] p 127 N83-10952
Radial guiding-center drifts and omnigenity in bumpy-torus confinement systems [DE82-019802] p 135 N83-14000

PLASMA DYNAMICS

- Behavior of a plasma in a high-density gas-embedded Z-pinch configuration [DE82-017396] p 125 N83-10935
MHD power Overview p 140 N83-15846

PLASMA ELECTRODES

- Computational model of a diffuse discharge on electrodes in a weakly ionized plasma p 114 N83-11952
Thermionically emitting copper cathode in contact with combustion plasmas p 116 N83-16101

PLASMA EQUILIBRIUM

- Plasma equilibrium and field diffusion during current rise phase of STP-2 screw pinch Tokamak [IPPJ-594] p 123 N83-10919
Radial effects in heating and thermal stability of a sub-ignited Tokamak [DE82-009384] p 124 N83-10932
Parametric systems analysis of the Modular Stellarator Reactor (MSR) [DE82-016244] p 126 N83-10945
Dynamics of ionization and transport in a magnetically confined plasma column p 153 N83-16132

PLASMA FLUX MEASUREMENT

- Deuteron flux measurements in the edge plasmas of PLT and PDX during auxiliary heating experiments [DE82-001909] p 139 N83-15143

PLASMA FOCUS

- Fusion at counterstreaming ion beams Ions Optic Fusion (IOF) p 151 N83-16124
A time resolving method for determining the energy spectrum of neutrons emitted by a plasma focus device p 153 N83-16133

PLASMA FREQUENCIES

- Short wavelength lower hybrid waves nonlinearly excited due to ponderomotive density modulation p 151 N83-16118

PLASMA GENERATORS

- Rippling modes in the edge of a Tokamak plasma [DE82-007724] p 125 N83-10940
Radial guiding-center drifts and omnigenity in bumpy-torus confinement systems [DE82-019802] p 135 N83-14000

PLASMA GUNS

- Development of current sheath on output of coaxial gun p 152 N83-16125

PLASMA HEATING

- Antenna-plasma coupling theory for ICRF heating of large tokamaks [DE82-013226] p 125 N83-10933
Lower hybrid RF current drive and electron-cyclotron heating on the Versator 2 Tokamak [DE82-017127] p 125 N83-10934
Wildcat. A catalyzed D-D Tokamak reactor [DE82-013712] p 125 N83-10938
Fusion Energy Division automation of the ISX-B neutral beams [DE82-016369] p 132 N83-13008
Poloidal ohmic heating in a multipole [DE82-019888] p 134 N83-13998
Eleventh Czechoslovak Seminar on Plasma Physics and Technology [IPPCZ-244] p 150 N83-16114
Tokamak research in the Soviet Union p 150 N83-16115
Lower-hybrid heating experiment on the TM-1-MH Tokamak p 150 N83-16116
Power spectrum optimization of the three-waveguide grill for the T-7 Tokamak p 150 N83-16117
Short wavelength lower hybrid waves nonlinearly excited due to ponderomotive density modulation p 151 N83-16118
Soft X-ray diagnostics on Tokamak TM-1-MH p 151 N83-16121
Energy balance in TM-1-MH Tokamak (ohmic heating) p 151 N83-16122
Soft X-ray and VUV emission from REB-heated plasma in REBEX 1 and REBEX 1 machines p 152 N83-16130
Dynamical model of an overheated magnetized plasma p 152 N83-16131
Global model of a hybrid Tokamak reactor with an auxiliary RF heating p 153 N83-16137
Physics (selected articles) [AD-A119830] p 154 N83-16143

PLASMA-PARTICLE INTERACTIONS

- Effect of low-frequency density fluctuations on ion-cyclotron waves [DE82-002829] p 155 N83-16222
CAMAC based inter-computer communications system [DE82-002879] p 156 N83-16233

PLASMA INTERACTIONS

- Effect of low-frequency density fluctuations on ion-cyclotron waves [DE82-002829] p 155 N83-16222

PLASMA JETS

- Computational model of a diffuse discharge on electrodes in a weakly ionized plasma p 114 N83-11952
Crater formation by high current discharges in vacuum p 152 N83-16129
Evaluation of plasma jet ignition for improved performance of alternate fuels [AD-A120160] p 112 N83-16212

PLASMA PHYSICS

- US-Japan Joint Institute for Fusion Theory Workshop on Nonequilibrium Statistical Physics Problems in Fusion Plasmas Stochasticity and Chaos [IPPJ-587] p 123 N83-10920
US-Japan Workshop on Burning Plasma Physics and Engineering [IPPJ-599] p 124 N83-10921
Proceedings of International Topical Meeting on ICF Research by Light-Ion Beam [IPPJ-611] p 138 N83-15126
Analytical and numerical calculations of field-reversed Theta-pinch equilibria based on a generalized Hill's vortex model [DE82-003150] p 139 N83-15139
Eleventh Czechoslovak Seminar on Plasma Physics and Technology [IPPCZ-244] p 150 N83-16114
Tokamak research in the Soviet Union p 150 N83-16115
Lower-hybrid heating experiment on the TM-1-MH Tokamak p 150 N83-16116
Power spectrum optimization of the three-waveguide grill for the T-7 Tokamak p 150 N83-16117
Short wavelength lower hybrid waves nonlinearly excited due to ponderomotive density modulation p 151 N83-16118
Electron impact ionization of highly charged molybdenum impurities in Tokamak plasmas p 151 N83-16119
ANDROMEDA The system for the acquisition and numerical data processing and its application for experimental device Tokamak TM-1-MH p 151 N83-16120
Soft X-ray diagnostics on Tokamak TM-1-MH p 151 N83-16121
Energy balance in TM-1-MH Tokamak (ohmic heating) p 151 N83-16122
Fusion at counterstreaming ion beams Ions Optic Fusion (IOF) p 151 N83-16124
Development of current sheath on output of coaxial gun p 152 N83-16125
Soft X-ray and VUV emission from REB-heated plasma in REBEX 1 and REBEX 1 machines p 152 N83-16130
Perform experiments on LINUS-O and LTX imploding liquid liner fusion systems [AD-A120052] p 154 N83-16214
High-n collisionless ballooning modes in axisymmetric toroidal plasmas [DE82-002831] p 154 N83-16217
Authors guide to publishing in the fields of plasma physics and controlled fusion [DE82-002866] p 155 N83-16230

PLASMA PROPULSION

- Measurements of energy distribution and thrust for microwave plasma coupling of electrical energy to hydrogen for propulsion [AIAA PAPER 82-1951] p 75 N83-12508

PLASMA SHEATHS

- Rippling modes in the edge of a Tokamak plasma [DE82-007724] p 125 N83-10940

PLASMA TEMPERATURE

- Apparatus for plasma electron temperature and density measurements by Thomson scattering p 153 N83-16134

PLASMA-ELECTROMAGNETIC INTERACTION

- Three-dimensional fluid and electrodynamic modeling for MHD DCW channels [AIAA PAPER 83-0464] p 117 N83-16732

PLASMA-PARTICLE INTERACTIONS

- Study of the ionic distribution and of the energy deposition in a plasma of Tokamak heated by injection of fast neutrals [EUR-CEA-FC-1094] p 155 N83-16226

PLASMAGUIDES

Sausage instability of Z-discharged plasma channel in LIB-fusion device
[IPPJ-602] p 123 N83-10917

PLASMAS (PHYSICS)

Technology spin-offs from the magnetic fusion energy program
[DE82-016923] p 123 N83-10897
Production and experimental study of the dissipative trapped ion instability p 123 N83-10910
Fusion reactor plasma-performance modeling
POPCON analysis
[DE82-016364] p 126 N83-10943
Observations of plasma rotation in the high-beta Tokamak Torus 2
[DE82-019373] p 127 N83-10952
Neutral-beam deposition in large, finite-beta noncircular Tokamak plasmas
[DE82-008146] p 127 N83-10957
Stabilization of axisymmetric mirror plasma by energetic ion injections
[DE81-030341] p 155 N83-16229

PLASMONS

Solar energy conversion using surface plasmons for broadband energy transport p 69 N83-15815

PLATING

Method for depositing an oxide coating
[NASA-CASE-LEW-13131-1] p 39 N83-10494

PLUMES

LNG plume interaction with surface obstacles
[PB82-198995] p 12 N83-12666
Evaluation of short-term NO₂ plume models for point sources Volume 1 Technical discussion
[PB82-234329] p 16 N83-13658

PLYWOOD

Design of plywood and paper flywheel rotors
p 165 N83-14662

PNEUMATIC EQUIPMENT

Pneumatic stowing with lateral discharge in coal faces with thick seams
[BMFT-FB-T-82-074] p 90 N83-10617
Dry processing of power plant coal rich in inerts --- use of air classifier for dry upgrading of coal with high inerts content
[BMFT-FB-T-82-101] p 90 N83-10631
Gas-to-hydraulic power converter
[NASA-CASE-MSC-18794-1] p 136 N83-14693

POINT DEFECTS

Defect behavior in electron-irradiated boron- and gallium-doped silicon p 70 N83-15823

POINTING CONTROL SYSTEMS

Optimal sun-alignment techniques of large solar arrays in electric propulsion spacecraft
[AIAA PAPER 82-1898] p 25 A83-12475

POLARIMETERS

Faraday-rotation measurements in ISX-B
[DE82-011507] p 127 N83-10953

POLAROGRAPHY

Development of instrumental methods of analysis of sulfur compounds in coal-process streams
[DE82-003291] p 20 N83-14776

POLICIES

Recommendation on national radioactive waste management policies
[DE81-029916] p 17 N83-13972

POLLUTION CONTROL

NO_x formation experiments in an MHD simulation facility p 116 A83-16103
Reconstruction and testing of the flue gas desulfurizing plant. Weiher 2
[BMFT-FB-T-82-108] p 91 N83-10652
NO sub x emission control for heavy duty vehicles
Toward meeting a 1986 standard
[PB82-183880] p 7 N83-10665
Development of criteria for extension of applicability of low-emission, high-efficiency coal burners
[PB82-197153] p 93 N83-11377
Utilization of ANCIT plant by-products
[BMFT-FB-T-82-144] p 94 N83-11600
Impact of NO_x selective catalytic reduction processes on flue gas cleaning systems
[PB82-240086] p 16 N83-13664
Environmental assessment of stationary source NO_x control technologies
[PB82-249350] p 16 N83-13665

POLLUTION MONITORING

Southern California offshore air quality model validation study Volume 1 Executive summary --- oil exploration pollution impact
[PB82-190711] p 9 N83-11631
Southern California offshore air quality model validation study Volume 2 Synthesis of findings
[PB82-190729] p 9 N83-11632
Sampling for high-molecular-weight organic compounds in power plant stack gases
[PB82-234618] p 16 N83-13659

Automatic interpretation of MSS-LANDSAT data applied to coal refuse site studies in southern Santa Catarina State, Brazil
[E83-10066] p 18 N83-14575

POLLUTION TRANSPORT

Population hazards resulting from the combustion of fossil fuels and the nuclear power industry
[BLL-RISLEY-TR-4173-(9091 9)] p 11 N83-12594
Atmosphere-biosphere interactions Toward a better understanding of the ecological consequences of fossil fuel combustion
[PB82-182098] p 12 N83-12672
Boiler efficiency and emissions testing using Refuse-Derived Fuel (RDF) and coal
[AD-A119291] p 19 N83-14772

POLYACETYLENE

Polymenc metallic electrodes for rechargeable battery applications p 160 A83-11813

POLYCRYSTALS

Polycrystalline lanthanum rhodate and lutetium rhodate photoelectrodes for liquid junction solar cells
p 33 A83-15480
Large grain polycrystalline silicon from rice husk --- for terrestrial solar cells p 33 A83-15492
Thin film polycrystalline Si p-n junction solar cells with preferential doping p 36 A83-17766
Union Carbide Corp polysilicon status and plans p 40 N83-10508
Methods for investigating the properties of polycrystalline silicon p-n junction solar cells p 46 N83-10565
Electrochemical storage cell based on polycrystalline silicon
[DE82-020595] p 56 N83-13600
Development of a polysilicon process based on chemical vapor deposition, phase 1
[NASA-CR-169633] p 59 N83-14673

POLYIMIDES

A preliminary evaluation of a potential space worth encapsulant p 72 N83-15832

POLYISOBUTYLENE

The effect of additives on the aerosolization of JP-5 jet fuel
[AD-A119324] p 106 N83-14294

POLYMER CHEMISTRY

Development of improved separators for alkaline zinc batteries
[AD-A119150] p 166 N83-14743

POLYMERIC FILMS

Thin film concentrator panel development p 42 N83-10529

Development and evaluation of polyvinyl-alcohol blend polymer films as battery separators
[NASA-TM-82981] p 167 N83-15372

POLYMERIZATION

Coating of laser fusion targets by plasma polymerized organic thin films p 152 N83-16126

POLYMERS

Tritium waste control October 1980 - March 1981
[DE82-002088] p 20 N83-14774

POLYVINYL ALCOHOL

Development and evaluation of polyvinyl-alcohol blend polymer films as battery separators
[NASA-TM-82981] p 167 N83-15372

PONDEROMOTIVE FORCES

Short wavelength lower hybrid waves nonlinearly excited due to ponderomotive density modulation p 151 N83-16118

PONDS

Effects of oil on tundra ponds and streams
[DE82-018899] p 15 N83-13649

POROSITY

Pore size engineering applied to starved electrochemical cells and batteries
[NASA-TM-82893] p 119 N83-10134
Numerical simulation of fluid flow in porous/fractured media
[DE82-002631] p 107 N83-14454

POROUS MATERIALS

Aquifer stability investigation
[DE82-003831] p 166 N83-14754

PORTABLE EQUIPMENT

Evaluation of methods for rapid determination of freezing point of aviation fuels
[NASA-CR-167981] p 83 N83-10207
Assessment of alternative power sources for mobile mining machinery
[NASA-TM-82695] p 136 N83-14691

POSITION (LOCATION)

Progress and development status of the Space Telescope solar array p 67 N83-14736

POTASSIUM COMPOUNDS

Advanced alkaline electrolysis cell development. Development of electrolysis operation cell separator for 1250C
[DE82-020697] p 76 N83-13593

POTENTIAL ENERGY

Candidate wind-turbine-generator site Data summary
[DE82-020416] p 99 N83-12785

POTENTIOMETERS (INSTRUMENTS)

Development and testing of a spacecraft surface potential monitor p 65 N83-14718

POWDERED ALUMINUM

Production technology of an electrolyte for Na/S batteries
[BMFT-FB-T-82-065] p 161 N83-10614

POWER CONDITIONING

Power conditioning unit development for MAG-TRANSIT p 113 A83-11021
Power conditioning in an autonomous system controlled by a microprocessor Simulation of use with a photovoltaic generator --- French thesis p 30 A83-13807
Electric power supply of aircraft --- Russian book p 115 A83-14115
Rooftop applications p 40 N83-10515
Garrett solar Brayton engine/generator status p 44 N83-10545
Power conditioning subsystem design
[AD-A117736] p 121 N83-10569
Research needs Prime-power for high energy space systems
[AD-A119243] p 135 N83-14156
Distributed photovoltaic systems Utility interface issues and their present status Intermediate/three-phase systems --- power conditioning p 61 N83-14686
Applications of materials surface modification to prime power systems p 144 N83-15878

POWER CONVERTERS

Gas-to-hydraulic power converter
[NASA-CASE-MSC-18794-1] p 136 N83-14693

POWER EFFICIENCY

Optimal sun-alignment techniques of large solar arrays in electric propulsion spacecraft p 25 A83-12475
[AIAA PAPER 82-1898] p 27 A83-13482
Hybrid thermoelectric solar collector design and analysis
50 per cent more output power from an albedo-collecting flat panel using bifacial solar cells p 29 A83-13700
Power augmentation in a Savonius-type wind-turbine by using a single air-deflecting vane p 115 A83-14725
A relativistic plasma microwave generator p 115 A83-15909
Test results of a medium temperature solar engine p 115 A83-16000
Extremal MHD generator p 117 A83-16110
Performance results of a 300 MWh generator at high magnetic field
[AIAA PAPER 83-0394] p 117 A83-16690
A method for analyzing thermionic-converter batteries p 119 A83-19609

POWER LINES

Flexible gas insulated cable for high power transmission
[BMFT-FB-T-82-099] p 158 N83-10370

POWER PLANTS

A parametric analysis of the performances of a linear collectors' network of a solar power plant p 36 A83-18139
Methods of reducing energy consumption of the oxidant supply system for MHD/steam power plants
[NASA-TM-83025] p 133 N83-13589

POWER SPECTRA

Power spectrum optimization of the three-waveguide grill for the T-7 Tokamak p 150 N83-16117

POWER SUPPLIES

Protection of large capacitor banks
[DE82-017353] p 120 N83-10366
Fundamental research into high voltages for further development of electric power distribution systems
[BMFT-FB-T-82-064] p 157 N83-10368
Garrett solar Brayton engine/generator status p 44 N83-10545
Power conditioning subsystem design
[AD-A117736] p 121 N83-10569
Study of photovoltaic residential retrofits Volume 1 Executive summary
[DE82-015793] p 46 N83-10605
Intermediate photovoltaic system application experiment operational performance Volume 6 for Lovington Square Shopping Center, Lovington, NM
[DE82-015476] p 47 N83-10608
Photovoltaic balance-of-system assessment
[DE82-906429] p 57 N83-13622
Investigation of power processing technology for spacecraft applications
[AD-A119644] p 135 N83-14151

SUBJECT INDEX

Assessment of alternative power sources for mobile mining machinery [NASA-TM-82695] p 136 N83-14691

POWER SUPPLY CIRCUITS
Loading schemes for a 50 MWth diagonally connected MHD generator p 113 A83-10659

POWER TRANSMISSION (LASERS)
Status of thermoelectronic laser energy conversion, TELEC p 143 N83-15884

PRECIPITATION (CHEMISTRY)
Particle size distribution of Ni microprecipitates in LaNi5 used for hydrogen storage p 75 A83-12295

PREDICTION ANALYSIS TECHNIQUES
The prediction of the thermal performance of building by the CR-method — heat storage and transmission [CSIR-BRR-396] p 161 N83-11578
Preliminary results of Helios solar generator inflight performance evaluation p 64 N83-14716
Analytic tools for the electrical design of solar generators p 66 N83-14727

PREDICTIONS
Some comments on the World Energy Conference (WEC) energy demand model [USIP-82-04] p 15 N83-13628

PREMIXING
Furnigation of alcohol in a light duty automotive diesel engine [NASA-CR-167915] p 100 N83-13272

PREPARATION
Expansion of coal-preparation-plant simulator [DE82-001576] p 106 N83-14301

PRESSURE DEPENDENCE
High-Temperature-Turbine-Technology Program Phase 2 Technology test and support studies Turbine spool technology ng fuel-contaminant tolerance test [DE82-020287] p 101 N83-13464

PRESSURE DISTRIBUTION
An analytical investigation of mass flow, pressure and temperature in a flat-plate solar collector p 37 A83-18452
Vertical axis wind turbine program p 147 N83-15913

PRESSURE MEASUREMENT
Study of the freezing pressure acting on a shaft lining p 110 N83-15732
Analysis of combustion spectra containing organ pipe tone by cepstral techniques [NASA-TM-83034] p 77 N83-16153

PRESSURE PULSES
Commercialization of a pulse combustion furnace with ultrahigh efficiency [PB82-243809] p 12 N83-13217
Symposium on Pulse-Combustion Applications Volume 1 Proceedings [PB82-240060] p 159 N83-13310

PRESSURIZED WATER REACTORS
Survey of utility load management projects Third revised report [DE82-000888] p 169 N83-15957

PRIMARY BATTERIES
Primary lithium organic electrolyte battery BA-5588 [AD-A120858] p 146 N83-15900

PRISMS
Volatile production during preignition heating [DE82-003061] p 109 N83-15402

PROBABILITY DENSITY FUNCTIONS
Generalized characteristics and applicability of various probability distributions for wind energy applications p 112 A83-10654
Wind power potential in Belgium [PUBL-SER-B-115] p 86 N83-10563

PROBABILITY DISTRIBUTION FUNCTIONS
Generalized characteristics and applicability of various probability distributions for wind energy applications p 112 A83-10654

PROCEDURES
Regional energy planning Some suggestions to public administration [CISE-1795] p 19 N83-14785

PROCESS CONTROL (INDUSTRY)
A manufacturer's perspective of measurement equipment needs for the photovoltaics industry p 32 A83-15454
Flat-plate collector research area Silicon material task p 41 N83-10519
Project analysis and integration area p 41 N83-10524

PROCESS HEAT
Hard coal gasification using catalysts dissolved in steam [BMFT-FB-T-82-107] p 82 N83-10146
Verification testing of the PKI collector at Sandia National Laboratories, Albuquerque, New Mexico p 43 N83-10534
PKI solar thermal plant evaluation at Capitol Concrete Products, Topeka, Kansas p 43 N83-10535

Urban waste as a potential source for brick plants p 88 N83-10591

Phototype plant for Nuclear Process Heat (NPH), reference phase R and D work on Hydrogenated Coal Gasification (HCG) Further operation of semi-industrial plant for hydrogenated coal gasification [BMFT-FB-T-82-088] p 90 N83-10625
Harnessing the Sun for development. Actions for consideration by the international community at the UN Conference on New and Renewable Sources of Energy for promoting the use of renewable energy in developing countries [DE82-020273] p 52 N83-12558
An overview of Solar Industrial Process-Heat (SIPH) applications below 120 deg C [DE82-021360] p 57 N83-13603
Proceedings of the 3rd Conference on Waste Heat Management and Utilization [PB82-227901] p 17 N83-13669
Once-through heat transport and seasonal storage for city of Bellingham [DE82-001501] p 169 N83-15956

PROCESSING
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 4 Production of samples of military fuels from raw shale oils [AD-A117526] p 83 N83-10211

PRODUCT DEVELOPMENT
Development of the spherical silicon solar cell p 36 A83-17347
Photovoltaic research needs industry perspective p 40 N83-10516
Research possibilities? No! Needs for research to make PV solar energy utilization broadly competitive p 40 N83-10517
The 40kW fuel cell field test support [PB82-231630] p 133 N83-13633
Large-area sheet task advanced dendritic web growth development [NASA-CR-169624] p 58 N83-14665
Large area low-cost space solar cell development p 62 N83-14699
Thin cell development and testing — solar cells p 62 N83-14702
Retrospect of solar cell development in West Germany p 64 N83-14712
Further developments of the ECS solar array p 64 N83-14715
Development and testing of a spacecraft surface potential monitor p 65 N83-14718
Progress and development status of the Space Telescope solar array p 67 N83-14736
Flat plate solar collectors [BMFT-FB-T-82-139] p 68 N83-14764
Progress in developing high performance solar blankets and arrays p 71 N83-15829
A preliminary evaluation of a potential space worth encapsulant p 72 N83-15832
Silicon research and technology p 72 N83-15835
GaAs solar cells p 72 N83-15836

PRODUCTION COSTS
Price estimates for the production of wafers from silicon ingots [NASA-CR-169517] p 55 N83-13583

PRODUCTION ENGINEERING
Review - Solar-grade silicon p 29 A83-13677
The properties and production of solar cells p 35 A83-16183
Research, development, and demonstration of advanced lead-acid batteries for utility load leveling [DE82-019796] p 162 N83-11584
Solar cell having improved back surface reflector [NASA-CASE-LEW-13620-1] p 55 N83-13579
An assessment of gas-side fouling in cement plants [NASA-CR-169513] p 15 N83-13644
Solar arrays for small scientific satellites p 66 N83-14731

PRODUCTIVITY
A review of the Energy Productivity Center's least cost energy strategy study [PB82-188111] p 11 N83-12591

PROGRAMMING LANGUAGES
Energy policy formulation in South Africa. APL as a tool to identify options p 20 N83-14968

PROJECT MANAGEMENT
The small community solar thermal power experiment p 43 N83-10531
Small-scale waste-to-energy systems A state-of-the-art report p 4 N83-10583
Second program on energy research and technologies [NASA-TM-77154] p 13 N83-13587
Wind-energy program FY 1982 third quarterly review [DE82-019928] p 133 N83-13714
The SERI wind energy program p 21 N83-15915

PURIFICATION

PROJECT PLANNING
Sacramento Municipal Utility District 100-MW sub e photovoltaic plant p 40 N83-10513
PV history Lessons for the future p 40 N83-10514
Climatic aspects of planning impoundments and hydropower operations p 99 N83-12754
Wind-energy program FY 1982 third quarterly review [DE82-019928] p 133 N83-13714
The SERI wind energy program p 21 N83-15915

PROPORTIONAL COUNTERS
Soft X-ray diagnostics on Tokamak TM-1-MH p 151 N83-16121

PROPULSION SYSTEM CONFIGURATIONS
Research and technology, Lewis Research Center [NASA-TM-83038] p 167 N83-15169

PROPULSION SYSTEM PERFORMANCE
The theory of aircraft engines — Russian book p 113 A83-10675
Energy efficient engine Flight propulsion system preliminary analysis and design [NASA-CR-159859] p 9 N83-12094
Concept evaluation of automotive propulsion using liquid air/nitrogen, task 5 report p 129 N83-12439

PROTECTIVE COATINGS
Solar hemispherical reflectometer modification for second-surface mirror measurement [DE82-016913] p 47 N83-10610
Anti-static coat for solar arrays p 67 N83-14738

PROTON BEAMS
Analysis of target implosion irradiated by proton beam 1 Beam interaction with target plasma [IPPJ-612] p 134 N83-13989
Proceedings of International Topical Meeting on ICF Research by Light-Ion Beam [IPPJ-611] p 138 N83-15126

PROTON IRRADIATION
Analysis of target implosion irradiated by proton beam 1 Beam interaction with target plasma [IPPJ-612] p 134 N83-13989
Omnidirectional proton radiation of thin and thick solar cells p 63 N83-14709

PROTON MAGNETIC RESONANCE
A carbon-13 and proton nuclear magnetic resonance study of some experimental referee broadened-specification /ERBS/ turbine fuels p 78 A83-11482

PROTONS
Measurements of fusion reactions from a Tokamak plasma — plasma diagnostics p 124 N83-10926

PROTOTYPES
Use of test structures in the production of CdS/Cu2S photovoltaic devices p 32 A83-15455

PROVING
Miniaturized Cassegrainian concentrator concept demonstration p 71 N83-15830

PUBLIC HEALTH
Determination of a range of concern for mobile source emissions of hydrogen sulfide p 6 N83-10663
Total energy food plant 21 million gallon ethanol facility [DE82-019258] p 14 N83-13617

PULSE DURATION MODULATION
Proceedings of International Topical Meeting on ICF Research by Light-Ion Beam [IPPJ-611] p 138 N83-15126

PULSED LASERS
Pulsed power for inertial-confinement fusion [DE82-001891] p 137 N83-15116

PULSED RADIATION
Particle-beam fusion [DE82-003107] p 138 N83-15118

PULSES
Symposia on Pulse-Combustion Applications and Condensing Heat Exchangers [PB82-184086] p 91 N83-10641

PUMPING
Fully controllable heat pipe containing a short electro-osmotic pumping section [AIAA PAPER 83-0317] p 157 A83-16647

PUMPS
Darneus wind-turbine and pump performance for low-lift irrigation pumping [DE82-016270] p 131 N83-12564
Gas-to-hydraulic power converter [NASA-CASE-MSC-18794-1] p 136 N83-14693
Modification of feed/effluent flow work exchangers for slurry service and power recovery in coal liquefaction processes [DE82-004114] p 110 N83-15499

PURIFICATION
Technical and economic assessment of processes for the production of butanol and acetone [NASA-CR-169623] p 106 N83-14293

PYRITES

PYRITES

- Fossil-energy
[DE82-018269] p 86 N83-10570
- Rapid analysis of mineral content of coal Development of an on-line monitoring instrument for pyrite and ash in coal p 86 N83-10571
- Physicochemical cleaning and recovery of coal p 87 N83-10577
- Petrographic evaluation of pyrite in the products from two-stage coal-pyrite flotation [DE82-003593] p 105 N83-14208
- PYROELECTRICITY**
Study of the photovoltaic effect in thin film barium titanate [NASA-CR-169435] p 46 N83-10567
- PYROLYSIS**
Kinetics and catalysis of producing synthetic gases from biomass [PB82-214347] p 82 N83-10156
- The heat capacity of coal chars p 83 N83-10206
- Thermal reactor — liquid silicon production from silane gas [NASA-CASE-NPO-14369-1] p 75 N83-10501
- Pyrolysis of organic compounds containing long unbranched alkyl groups [AD-A119749] p 104 N83-14165
- Reaction kinetics and diagnostics for oil-shale retorting [DE82-001598] p 112 N83-15952

Q

QUADRUPOLES

- Analysis of stabilization effect of quadrupole field on theta pinch plasmas [IPPJ-608] p 131 N83-12995

QUALITATIVE ANALYSIS

- Rapid analysis of mineral content of coal Development of an on-line monitoring instrument for pyrite and ash in coal p 86 N83-10571

QUALITY CONTROL

- Commercial Photovoltaics Measurements Workshop, Vail, CO, July 27-29, 1981, Proceedings p 32 A83-15452
- A manufacturer's perspective of measurement equipment needs for the photovoltaics industry p 32 A83-15454
- Quality assurance in support of energy related monitoring activities [PB82-234238] p 16 N83-13657

QUANTITATIVE ANALYSIS

- Rapid analysis of mineral content of coal Development of an on-line monitoring instrument for pyrite and ash in coal p 86 N83-10571

QUANTUM EFFICIENCY

- Process for high photocurrent in IBC solar cells — Interdigitated Back Contact p 24 A83-12059
- Projected temperature dependence of quantum yields for photoreactions involving energy or electron transfer p 37 A83-18559

QUENCHING (COOLING)

- Magnetoelastic instabilities and vibrations of superconducting-magnet systems [DE82-015208] p 123 N83-10880

R

RADAR IMAGERY

- Exploration for fractured petroleum reservoirs using radar/Landsat merge combinations p 77 A83-10031
- Radar and infrared remote sensing of geothermal features at Pilgrimage Springs, Alaska p 79 A83-12036

RADIANCE

- Radial effects in heating and thermal stability of a sub-ignited Tokamak [DE82-009384] p 124 N83-10932

RADIANT FLUX DENSITY

- On the surface radiation budget p 22 A83-10100
- Methods to enhance blanket power density [DE82-017467] p 127 N83-10958

RADIANT HEATING

- Radiant heating tests of several liquid metal heat-pipe sandwich panels [AIAA PAPER 83-0319] p 157 A83-16649
- Analysis of thermal comfort in a passive solar heated residence [PB82-180142] p 39 N83-10297

RADIATION ABSORPTION

- Thermal and optical analysis of an evacuated circular cylindrical concentrating collector p 29 A83-13697

RADIATION DAMAGE

- Radiation damage in front and back illuminated high resistivity silicon solar cells [NASA-TM-82965] p 48 N83-10962

- The reduction of radiation damage in solar cells A study of radiation defects in silicon, first phase [CESR-81-985] p 57 N83-13626

- Effects of processing and dopant on radiation damage removal in silicon solar cells p 63 N83-14708
- Omnidirectional proton radiation of thin and thick solar cells p 63 N83-14709

- The reduction of radiation damage in space solar cells A study of radiation defects in silicon (+) p 63 N83-14710

- Radiation damage and annealing in large area n+/p/p+ GaAs shallow homojunction solar cells p 71 N83-15826

- Basis for equivalent fluence concept in space solar cells p 71 N83-15827
- GaAs solar cells p 72 N83-15836
- Radiation damage p 72 N83-15837

RADIATION DISTRIBUTION

- Studies on radiation intensity distribution in the focus of compound parabolic concentrators p 38 A83-18565

RADIATION EFFECTS

- Grown-in defects and defects produced by 1-Me electron irradiated in AlO₃Ga_{0.7}As P-N junction solar cells p 71 N83-15828

RADIATION HARDENING

- Prime power for high-energy space systems Certain research issues p 143 N83-15863

RADIATION HAZARDS

- Population hazards resulting from the combustion of fossil fuels and the nuclear power industry [BLL-RISLEY-TR-4173-(9091 9)] p 11 N83-12594
- The experience collected in the management of the Centro Informazioni Studi Esperienze (CISE) radioactive waste from 1960 to 1980 [CISE-1738] p 17 N83-13977

RADIATION MEASUREMENT

- Global solar radiation estimation from relative sunshine hours in Italy p 26 A83-12951
- Spectroradiometer measurements in support of photovoltaic device testing p 32 A83-15458
- Determination of climatological parameters of global radiation and direct solar radiation for horizontal, not horizontal, fixed and normal incident radiation absorber [BMFT-FB-T-82-070] p 48 N83-10718

RADIATION SHIELDING

- ORNL integral experiment to provide data for evaluating magnetic-fusion-energy shielding concepts Part 1 Attenuation measurements [DE82-019775] p 135 N83-13999

RADIATIVE HEAT TRANSFER

- Theoretical and experimental investigation of high temperature insulators subjected to intense visible radiation [AIAA PAPER 83-0158] p 35 A83-16562

RADIO COMMUNICATION

- Publications of the Jet Propulsion Laboratory, 1981 [NASA-CR-169518] p 170 N83-14016

RADIO FREQUENCY HEATING

- Antenna-plasma coupling theory for ICRF heating of large tokamaks [DE82-013226] p 125 N83-10933

RADIO FREQUENCY INTERFERENCE

- Instrument landing system localizer receiver performance in the presence of co-channel interference [AD-A118909] p 99 N83-13089

RADIO RECEIVERS

- Instrument landing system localizer receiver performance in the presence of co-channel interference [AD-A118909] p 99 N83-13089

RADIO WAVES

- The phototron A light to RF energy conversion device p 143 N83-15866

RADIOACTIVE DECAY

- Parametric study of geohydrologic performance characteristics for nuclear-waste repositories [DE82-003145] p 17 N83-13973

RADIOACTIVE WASTES

- Recommendation on national radioactive waste management policies [DE81-029916] p 17 N83-13972

- Parametric study of geohydrologic performance characteristics for nuclear-waste repositories [DE82-003145] p 17 N83-13973

- Nuclear fuel cycle and waste management in France [DE81-700732] p 104 N83-13975

- Synroc processing options — processing nuclear reactor wastes using a titanate based ceramic [DE82-004230] p 17 N83-13976

- The experience collected in the management of the Centro Informazioni Studi Esperienze (CISE) radioactive waste from 1960 to 1980 [CISE-1738] p 17 N83-13977

- Nuclear and coal waste disposal hampered by legal, regulatory and technical uncertainties [EMD-82-63] p 19 N83-14770

- Vitrification of high-level radioactive waste in a small-scale joule-heated ceramic melter [DE82-002227] p 21 N83-15113

- Packaging of radioactive wastes for sea disposal [IAEA-TECDOC-240] p 21 N83-15114

- Risks, regulation responsibilities and costs in nuclear waste management. A preliminary survey in the European Community [EUR-6893] p 21 N83-15115

- USDOE activities in low-level radioactive waste treatment [DE82-001450] p 22 N83-16195

RADIOACTIVITY

- Population hazards resulting from the combustion of fossil fuels and the nuclear power industry [BLL-RISLEY-TR-4173-(9091 9)] p 11 N83-12594

RADIOISOTOPE BATTERIES

- Nuclear energy in space p 113 A83-11837

RAIL TRANSPORTATION

- The modal split in the Japanese passenger transportation system [DFVLR-FB-82-09] p 9 N83-11887
- Application of fuel cells to highway and nonhighway transportation [DE82-004365] p 156 N83-16259

RAMAN SPECTRA

- Hot-electron luminescence in aged electrodeposited CdSe liquid-junction solar cell p 36 A83-16946
- Energy and technology review [DE82-019371] p 137 N83-14747

RANKINE CYCLE

- The rebirth of the Rankine cycle - Energy production on the basis of low- and medium-temperature heat sources p 113 A83-11868
- Organic Rankine power conversion subsystem development for the small community solar thermal power system p 43 N83-10533
- Concept evaluation of automotive propulsion using liquid air/nitrogen, task 5 report p 129 N83-12439
- Power conversion Overview p 145 N83-15898

RAPID TRANSIT SYSTEMS

- Power conditioning unit development for MAG-TRANSIT p 113 A83-11021

RARE EARTH COMPOUNDS

- Polycrystalline lanthanum rhodate and lutetium rhodate photoelectrodes for liquid junction solar cells p 33 A83-15480

RATES (PER TIME)

- Transport of light-ion beams in plasma channels [DE82-001649] p 139 N83-15140

RAY TRACING

- Thermal and optical analysis of an evacuated circular cylindrical concentrating collector p 29 A83-13697

REACTION KINETICS

- Solar energy storage by the reversible reaction - N₂O₄ yields 2NO₂ - Theoretical and experimental results p 37 A83-18554

- Photosynthetic water splitting [PB82-200684] p 76 N83-12206

- Pulverized coal combustion [DE82-002969] p 105 N83-14198

- Investigation of the hydrochlorination of SC₄ [NASA-CR-169621] p 58 N83-14668

- Investigation of the hydrochlorination of SiCl₄ [NASA-CR-169622] p 60 N83-14682

- Reaction kinetics and diagnostics for oil-shale retorting [DE82-001598] p 112 N83-15952

REACTION PRODUCTS

- Ashing properties of coal blends p 86 N83-10572

REACTIVITY

- Pulverized coal combustion [DE82-002969] p 105 N83-14198

REACTOR CORES

- Enhanced heat pipe theory and operation p 145 N83-15893

REACTOR DESIGN

- Thermal reactor — liquid silicon production from silane gas [NASA-CASE-NPO-14369-1] p 75 N83-10501

- Feasibility study of a fission-suppressed tandem-mirror hybrid reactor [DE82-019375] p 134 N83-13997

- Fusion materials Adapting to realistic reactor environments [DE82-002708] p 138 N83-15132

- Designs of tandem-mirror fusion reactors [DE82-000845] p 138 N83-15134

- Effects of reactor design, component characteristics and operating temperatures on direct conversion power systems p 142 N83-15857

- ELMO Bumpy Torus fusion-reactor design study [DE82-002388] p 154 N83-16218

- Prospects of low-activation fusion-reactor design [DE82-003198] p 155 N83-16231

SUBJECT INDEX

REACTOR MATERIALS

- Special-purpose materials for magnetically confined fusion reactors [DE82-005310] p 134 N83-13974
- Fusion materials: Adapting to realistic reactor environments [DE82-002708] p 138 N83-15132
- Technological boundary conditions for nuclear electric space power plants p 142 N83-15856
- Some material implications of space nuclear reactors (non-fuel materials) p 170 N83-15870
- Prospects of low-activation fusion-reactor design [DE82-003198] p 155 N83-16231

REACTOR STARTUP TESTS

- Fusion reactor plasma-performance modeling POPCON analysis [DE82-016384] p 126 N83-10943

REACTOR TECHNOLOGY

- Potential role and technology status of closed-cycle MHD for light-weight nuclear space-power systems p 142 N83-15853
- Overview of space reactors p 142 N83-15855
- Technological boundary conditions for nuclear electric space power plants p 142 N83-15856
- Effects of reactor design, component characteristics and operating temperatures on direct conversion power systems p 142 N83-15857
- Gas cooled reactors for large space power needs p 142 N83-15858
- Compact, high-power nuclear reactor systems based on small diameter particulate fuel p 143 N83-15859

REAL GASES

- Transient flow analysis of the AEDC/HPDE MHD generator [AIAA PAPER 83-0395] p 117 A83-16691

REAL TIME OPERATION

- A multi-site magnetotelluric measurement system with real-time data analysis [DE82-020596] p 98 N83-12704

RECOMBINATION REACTIONS

- Lifetime and effective surface recombination velocity measurements in high-efficiency Si solar cells [DE81-030381] p 74 N83-15953

RECORDING INSTRUMENTS

- Characterization of RDF properties through high pressure differential scanning calorimetry p 87 N83-10582

RECTENNAS

- Current topics of SPS realization from a European viewpoint p 156 A83-11283

RECTIFIERS

- Power conditioning subsystem design [AD-A117736] p 121 N83-10569

RECYCLING

- Technology-base research project for electrochemical storage report for 1981 [DE82-020599] p 163 N83-12573
- Program guide to used oil recycling [DOE/CS-40402/1] p 104 N83-14178
- Investigation of engineering and design considerations in selecting conveyors for densified Refuse-Derived Fuel (dRDF) and dRDF Coal mixtures [AD-A119065] p 107 N83-14495
- Catalytic liquefaction of biomass [DE82-003329] p 108 N83-14752

REDOX CELLS

- Electromagnetic studies of redox systems for energy storage [NASA-CR-169593] p 165 N83-14667
- The NASA Redox Storage System Development project, 1980 [NASA-TM-82940] p 166 N83-14683

REFINING

- Polycrystalline silicon availability for photovoltaic and semiconductor industries p 28 A83-13648
- Refining of military jet fuels from shale oil Part 1 Preliminary process design, economic and yield optimization, and computer modeling [AD-A117511] p 83 N83-10210

- An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil Part 4 Production of samples of military fuels from raw shale oils [AD-A117526] p 83 N83-10211

REFLECTANCE

- Optical properties of gold-magnesia selective cermets — for solar collectors p 33 A83-15482
- Solar hemispherical reflectometer modification for second-surface mirror measurement [DE82-016913] p 47 N83-10610

REFLECTED WAVES

- Transmittance of reflected diffuse radiation — for solar collectors p 38 A83-18564

REFLECTOMETERS

- Solar hemispherical reflectometer modification for second-surface mirror measurement [DE82-016913] p 47 N83-10610

REFLECTORS

- Asymmetric reflectors of the stepped spherical type p 38 A83-19194
- Solar cell having improved back surface reflector [NASA-CASE-LEW-13620-1] p 55 N83-13579
- Feasibility study of solid surface subreflector production techniques [NASA-CR-169642] p 60 N83-14678

REFRACTORY MATERIALS

- Refractory residues, condensates and chondrules from solar furnace experiments p 31 A83-15371
- Emission characteristics of refractory materials — as electrodes in aerodynamic generators p 116 A83-16019

- Theoretical and experimental investigation of high temperature insulators subjected to intense visible radiation [AIAA PAPER 83-0158] p 35 A83-16562

- Overview of high-temperature materials for high-energy space power systems p 144 N83-15869
- Materials for high power MHD systems p 144 N83-15872

- Evaluation of olivine ceramic refractories for thermal-energy-storage application [DE82-000108] p 168 N83-15947

REFRACTORY METAL ALLOYS

- Materials technology for coal-conversion processes [DE82-004036] p 96 N83-12253

REFRIGERATING MACHINERY

- Absorption refrigeration machines — Thesis p 156 A83-11525

REFRIGERATORS

- The rebirth of the Rankine cycle - Energy production on the basis of low- and medium-temperature heat sources p 113 A83-11868
- Regulation of the diurnal variation of the cold productivity of an adsorption-type solar refrigeration system p 31 A83-15135

REGENERATION (ENGINEERING)

- Advanced regenerative heat recovery system [PB82-200650] p 8 N83-11604

REGIONAL PLANNING

- Regional energy planning Some suggestions to public administration [CISE-1795] p 19 N83-14765

REGULATIONS

- Geothermal resource development for direct heat applications The impact of regulation [PB82-208414] p 8 N83-11606
- Environmental and regulatory aspects of compressed-air energy storage [DE82-003868] p 19 N83-14757
- Nuclear and coal waste disposal hampered by legal, regulatory and technical uncertainties [EMD-82-63] p 19 N83-14770
- Risks, regulation responsibilities and costs in nuclear waste management. A preliminary survey in the European Community [EUR-6893] p 21 N83-15115

REGULATORS

- On the power regulation of small wind turbines based on experience with small Danish wind turbines p 148 N83-15926

RELATIVISTIC ELECTRON BEAMS

- A relativistic plasma microwave generator p 115 A83-15909
- Apparatus for plasma electron temperature and density measurements by Thomson scattering p 153 N83-16134

RELATIVISTIC PLASMAS

- A relativistic plasma microwave generator p 115 A83-15909

RELAXATION TIME

- Effect of radiation and non-Maxwellian electron distribution on relaxation processes in an atmospheric cesium seeded argon plasma [EUT-82-E-124] p 140 N83-15144

RELIABILITY ANALYSIS

- Configuration selection study for isolated loads using parabolic dish modules p 45 N83-10548
- Investigation of reliability attributes and accelerated stress factors on terrestrial solar cells [NASA-CR-169620] p 59 N83-14670

RELIABILITY ENGINEERING

- Aquifer stability investigation [DE82-003831] p 166 N83-14754

REMOTE SENSING

- Applications of remote sensing to petroleum exploration p 77 A83-10030
- Remote sensing and uranium exploration at Lisbon Valley, Utah p 77 A83-10032

RESIDENTIAL ENERGY

- Applications of remote sensing to wind power facility siting p 77 A83-10041

- The use of near color infrared photography to assess the impact of the oil and natural gas industry on Louisiana's wetlands p 1 A83-10069

- On the surface radiation budget p 22 A83-10100
- The 100 days of Seasat-A p 78 A83-10115

- Radar and infrared remote sensing of geothermal features at Pilgrim Springs, Alaska p 79 A83-12036
- Remote sensing of coal-fired MHD by optical diagnostic techniques [AIAA PAPER 83-0469] p 80 A83-16736

- Computerized, remote monitoring systems for underground coal mines: Fires and explosive atmospheres [PB82-221359] p 3 N83-10481

- Remote sensing applications to the development of an integrated data base for oil and gas exploration p 107 N83-14628

REMOTE SENSORS

- Cryo-cooler development for space flight applications p 114 A83-13460

REPORTS

- Publications of the Jet Propulsion Laboratory, 1981 [NASA-CR-169519] p 170 N83-14016

RESEARCH

- MHD generator research at Stanford p 142 N83-15854

- USDOE activities in low-level radioactive waste treatment [DE82-001450] p 22 N83-16195

RESEARCH AND DEVELOPMENT

- Remote sensing of coal-fired MHD by optical diagnostic techniques [AIAA PAPER 83-0469] p 80 A83-16736

- National photovoltaic program p 3 N83-10506
- Photovoltaic research needs industry perspective p 40 N83-10516

- Evaluation of advanced R and D topics in photovoltaics p 41 N83-10518
- Second program on energy research and technologies [NASA-TM-77154] p 13 N83-13587

- NASA space photovoltaic research and technology programs p 64 N83-14713
- Silicon research and technology p 72 N83-15835
- The NASA Lewis large wind turbine program p 146 N83-15911

- Rocky Flats small wind systems program. An update p 146 N83-15912

RESEARCH FACILITIES

- Residential photovoltaic experiment station data system [DE82-001646] p 68 N83-14762

- The ORNL Thermal Energy Storage Program Technical support [DE81-030805] p 168 N83-15943

- The ORNL Thermal Energy Storage Program [DE81-032001] p 168 N83-15944

- Oil-shale program [DE82-900588] p 111 N83-15951

RESEARCH MANAGEMENT

- Arctic terrestrial environmental research programs of the Office of Energy Research, Department of Energy Evaluation and recommendations Appendix A: Terrestrial environmental research in Alaska during 1980-1981 [PB82-197096] p 9 N83-11633

- Users experience in Denmark Developments, achievements and experience of the Danish activities in wind energy utilization, 1974 - 1981 p 10 N83-12536

- Second program on energy research and technologies [NASA-TM-77154] p 13 N83-13587

RESERVOIRS

- Geothermal reservoir assessment, Roosevelt Hot Springs [DE82-020632] p 97 N83-12541

- Power from the hot-dry-rock geothermal resource [DE82-000759] p 107 N83-14750

- Aquifer stability investigation [DE82-003831] p 166 N83-14754

RESIDENTIAL ENERGY

- Thermal infrared sensing applied to energy conservation in building envelopes /Thermosense IV/, Proceedings of the Meeting, Ottawa, Ontario, Canada, September 1-4, 1981 p 2 A83-12686

- Analysis of thermal comfort in a passive solar heated residence [PB82-180142] p 39 N83-10297

- Economic efficiency in the sizing of residential heat pumps [PB82-179029] p 3 N83-10401

- Rooftop applications p 40 N83-10515
- Community heat-pump system, Klamath County, Oregon [DE82-015106] p 5 N83-10600

- Study of photovoltaic residential retrofits Volume 1
Executive summary p 46 N83-10605
[DE82-015793]
Feasibility study of geothermal heating, Modoc Lassen housing project p 89 N83-10611
[DE82-015099]
The prediction of the thermal performance of building by the CR-method — heat storage and transmission [CSIR-BRR-396] p 161 N83-11578
Basin view geothermal heating district, Klamath Falls, Oregon Conceptual design and economic-feasibility study report p 93 N83-11587
[DE82-015108]
Cogeneration Energy Systems assessment Volume 2 Technical discussion p 8 N83-11609
[PB82-200692]
J F Long experimental photovoltaic house p 50 N83-12547
[DE82-020508]
Solar-energy-system performance evaluation, Cathedral Square, Burlington, Vermont, July - December 1981 p 52 N83-12563
[DE82-016999]
Study of photovoltaic residential retrofits Volume 2 Main report p 53 N83-12566
[DE82-015626]
Electrical aspects of photovoltaic-system simulation p 53 N83-12568
[DE82-021956]
Data report for the Northeast Residential Experiment Station, Apr 1982 p 53 N83-12569
[DE82-021954]
Evaluation of estimated energy conservation measure costs and benefits in the residential multifamily sector p 14 N83-13606
[DE82-000490]
Residential End-use Energy Planning System (REEPS) p 14 N83-13619
[DE82-906444]
Residential photovoltaic experiment station data system p 68 N83-14762
[DE82-001646]
Field evaluation and assessment of thermal energy storage for residential space heating p 168 N83-15949
[DE82-000164]
- RESIDUES**
Refractory residues, condensates and chondrules from solar furnace experiments p 31 A83-15371
- RESISTANCE HEATING**
Poloidal ohmic heating in a multipole p 134 N83-13998
[DE82-019888]
- RESONANCE**
A review of resonance response in large, horizontal-axis wind turbines p 114 A83-13696
Lower-hybrid-heating experiments on the Alcator C and the Versator II Tokamaks p 132 N83-13007
[DE82-013674]
- RESONANCE FREQUENCIES**
A review of resonance response in large, horizontal-axis wind turbines p 114 A83-13696
- RESOURCES MANAGEMENT**
Landsat for resource evaluation and management in the Alberta foothills p 80 A83-14256
Institutional factors in resource recovery co-disposal demonstration project, Middlesex County, New Jersey, Spring 1980 - Summer 1981 p 4 N83-10588
Estimation of resource and reserves p 103 N83-13631
[PB82-230954]
- RETORT PROCESSING**
Reaction kinetics and diagnostics for oil-shale retorting p 112 N83-15952
[DE82-001598]
- RETROFITTING**
Energy recovery and cogeneration from an existing municipal incinerator p 5 N83-10589
Study of photovoltaic residential retrofits Volume 1 Executive summary p 46 N83-10605
[DE82-015793]
Proceedings of the conference on energy conservation Retrofit of Municipal Wastewater Treatment Facilities p 5 N83-10612
[DE82-013710]
Study of photovoltaic residential retrofits Volume 2 Main report p 53 N83-12566
[DE82-015626]
Alcohol as a fuel for farm and construction equipment p 100 N83-13277
[DE82-021022]
Development of the trickle roof cooling and heating system Experimental plan p 57 N83-13615
[DE82-019082]
- REVERSE FIELD PINCH**
Equilibrium poloidal field distributions in reversed-field-pinch toroidal discharges p 134 N83-13996
[DE82-014130]
Multidimensional MHD computations for the field-reversed theta pinch and the reversed-field pinch p 139 N83-15142
[DE82-004361]
- RHODIUM COMPOUNDS**
Polycrystalline lanthanum rhodate and lutetium rhodate photoelectrodes for liquid junction solar cells p 33 A83-15480

- RICE**
Large grain polycrystalline silicon from rice husk — for terrestrial solar cells p 33 A83-15492
- RIO GRANDE (NORTH AMERICA)**
A groundwater convection model for Rio Grande rift geothermal resources p 79 A83-11831
- RIPPLES**
Rippling modes in the edge of a Tokamak plasma p 125 N83-10940
[DE82-007724]
- RISK**
A reference-material system for estimating health and environmental risks of selected material cycles and energy systems p 15 N83-13647
[DE82-019309]
- RIVER BASINS**
A groundwater convection model for Rio Grande rift geothermal resources p 79 A83-11831
- ROCKS**
Preliminary design study of underground pumped hydro and compressed-air energy storage in hard rock Volume 8 Design approaches - UPH Appendix B Shafts p 164 N83-13607
[DE81-028202]
Power from the hot-dry-rock geothermal resource p 107 N83-14750
[DE82-000759]
Aquifer stability investigation p 166 N83-14754
[DE82-003831]
- ROCKY MOUNTAINS (NORTH AMERICA)**
Ideas for implementing air-quality studies in the western Rocky Mountain region p 22 N83-15960
[DE82-000063]
- ROOFS**
Development of the trickle roof cooling and heating system Experimental plan p 57 N83-13615
[DE82-019082]
- ROTARY WINGS**
On the rotary wing concept for jet stream electricity generation p 117 A83-16111
- ROTOR AERODYNAMICS**
The spectrum of wind speed fluctuations encountered by a rotating blade of a wind energy conversion system p 114 A83-13695
Cold-air performance of compressor-driven turbine of Department of Energy upgraded automobile gas turbine engine 2 Stage performance p 127 N83-11063
[NASA-TM-82818]
- ROTORS**
The effect of yaw on horizontal axis wind turbine loading and performance p 136 N83-14688
[NASA-TM-82778]
Measured performance of a tip-controlled, teetered rotor with an NACA 64 sub 3-618 tip airfoil p 136 N83-14689
[NASA-TM-82870]
Measurements on the Magdalen Islands VAWT and future projects p 148 N83-15929
- RUBY LASERS**
The Doublet III Thomson-scattering-system hemiconcentric triplet lens p 123 N83-10908
[DE82-017384]
- RURAL AREAS**
The worldwide market for photovoltaics in the rural sector p 73 N83-15840
[NASA-TM-83035]
- RUTHENIUM COMPOUNDS**
Oxygen evolution improvement at a Cr-doped SrTiO₃ photoanode by a Ru-oxide coating p 33 A83-15493

S

- SAFETY**
Biomedical and environmental sciences programs at the Oak Ridge National Laboratory p 13 N83-13516
[DE82-019897]
Lithium-sulfur dioxide (Li/SO₂) battery safety hazards Thermal studies p 163 N83-13591
[AD-A119381]
Development of photovoltaic array and module safety requirements p 60 N83-14681
[NASA-CR-169641]
Lithium/sulfur dioxide cell and battery safety p 135 N83-14684
[NASA-RP-1099]
- SAFETY MANAGEMENT**
Safety data for small wind systems p 131 N83-12565
[DE82-015400]
- SALINITY**
Assessment of high heat-transfer evaporators as power plan condensers to produce abundant freshwater p 7 N83-11277
[PB82-198045]
- SALT BEDS**
Economic comparison of CAES designs employing hardrock, salt and aquifer storage reservoirs p 167 N83-14758
[DE82-003833]
- SALTS**
The effect of crystal size on the thermal energy storage capacity of thickened Glauber's salt p 160 A83-18562
- SAMPLING**
Standardization of sampling and analysis of geopressured fluids Part 2 Monitoring of geopressured wells p 82 N83-10151
Diesel combustion analysis using rapid sampling techniques p 104 N83-14192
[AD-A119658]
- SANDWICH STRUCTURES**
Radiant heating tests of several liquid metal heat-pipe sandwich panels p 157 A83-16649
[AIAA PAPER 83-0319]
Fabrication and development of several heat pipe honeycomb sandwich panel concepts — airframe integrated scramjet engine p 170 N83-10379
[NASA-CR-165962]
- SATELLITE DRAG**
Optimal sun-alignment techniques of large solar arrays in electric propulsion spacecraft p 25 A83-12475
[AIAA PAPER 82-1898]
Prime power for high-energy space systems Certain research issues p 143 N83-15863
- SATELLITE OBSERVATION**
Remote sensing and uranium exploration at Lisbon Valley, Utah p 77 A83-10032
On the surface radiation budget p 22 A83-10100
Determination of the radiation budget at the Earth's surface from satellite data p 68 N83-14808
- SATELLITE POWER TRANSMISSION (TO EARTH)**
Solar satellites p 22 A83-10428
Current topics of SPS realization from a European viewpoint p 156 A83-11283
Low Earth orbit blanket technologies for the power range of 15-60 kW p 61 N83-14696
Advanced rigid array — satellite solar arrays p 82 N83-14697
Large area low-cost space solar cell development p 62 N83-14699
NASA space photovoltaic research and technology programs p 64 N83-14713
TV-SAT solar array p 64 N83-14714
Outlook for space energy systems at the end of the three-year assessment p 18 N83-14734
- SATELLITE SOLAR POWER STATIONS**
The satellite power system - Assessment of the environmental impact on middle atmosphere composition and on climate p 2 A83-14517
- SATELLITE TELEVISION**
TV-SAT solar array p 64 N83-14714
- SATELLITE TEMPERATURE**
Transient shutdown of an axial-groove liquid trap heat pipe thermal diode p 157 A83-19161
- SATELLITE-BORNE INSTRUMENTS**
Cryo-cooler development for space flight applications p 114 A83-13460
- SATELLITE-BORNE PHOTOGRAPHY**
Environmental monitoring of the Athabasca Oil Sands using Landsat data p 79 A83-11988
Landsat for resource evaluation and management in the Alberta foothills p 80 A83-14256
- SCATTER PLATES (OPTICS)**
Scatterplate flux mapping for solar concentrators p 54 N83-12588
[DE82-021359]
- SCHOOLS**
Intermediate photovoltaic system application experiment operational performance report. Volume 3 Beverly High School, Beverly, Massachusetts p 50 N83-12543
[DE82-006236]
Telluride School, Telluride, Colorado solar-energy-system performance evaluation, February 1982 - April 1982 p 54 N83-12585
- SCHOTTKY DIODES**
Schottky revisited — model limitations and steps for extending treatment to solar cell structures p 34 A83-15509
On the open-circuit voltage of a Schottky-barrier MIS solar cell p 36 A83-17770
- SCIENTIFIC SATELLITES**
Solar arrays for small scientific satellites p 66 N83-14731
- SCREW PINCH**
Plasma equilibrium and field diffusion during current rise phase of STP-2 screw pinch Tokamak p 123 N83-10919
[IPPJ-594]
- SEALS (STOPPERS)**
Energy efficient face seal p 21 N83-15659
[NASA-CR-165591]
- SEASAT 1**
The 100 days of Seasat-A p 78 A83-10115
- SEAWEEDES**
Microbiological studies towards optimization of methane from marine plant biomass p 92 N83-10756
[PB82-214362]

SUBJECT INDEX

SILICON

SEDIMENTS

- Hydrogeochemical and stream-sediment reconnaissance basic data for Ulica quadrangle, New York. Uranium Resource Evaluation Project [DE82-020429] p 102 N83-13552
- Hydrogeochemical and stream-sediment reconnaissance basic data for Manon, Canton, Pittsburgh and Cleveland quadrangles, Ohio; West Virginia, Pennsylvania. Uranium Resource Evaluation Project [DE82-020430] p 102 N83-13553
- Hydrogeochemical and stream-sediment reconnaissance basic data for Beaumont, Lake Charles and Baton Rouge quadrangles, Texas, Louisiana. Uranium Resource Evaluation Project [DE82-020438] p 102 N83-13554
- Hydrogeochemical and stream-sediment reconnaissance basic data for Ogdensburg and Lake Champlain quadrangles, New York; Vermont. Uranium Resource Evaluation Project [DE82-020417] p 102 N83-13557

SEISMOLOGY

- Seismology, 1981, nuclear test ban verification. Earthquake and Earth resource investigation [FOA-C-20460-T1] p 104 N83-13695

SELF-ERECTING DEVICES

- Low Earth orbit blanket technologies for the power range of 15-60 kW p 61 N83-14696

SELF-EXCITATION

- Self-excited MHD power source for space applications p 141 N83-15849

SEMICONDUCTING FILMS

- Properties of amorphous silicon solar cells p 25 A83-12321
- Valency control of glow discharge produced a-SiC:H and its application to heterojunction solar cells p 28 A83-13649
- Influence of deposition rate on the character of electrodeposited CdSe used for photoelectrochemical cells p 34 A83-15499
- Effect of hydrogen on the deposition rate for planar RF magnetron sputtering of hydrogenated amorphous silicon p 35 A83-16082

SEMICONDUCTOR DEVICES

- Recent progress of amorphous-silicon solar-cell technology in Japan p 24 A83-11803
- The influence of the interface state on the properties of solar cell semiconductor electrodes p 26 A83-13473
- A new method for experimental determination of the series resistance of a solar cell p 30 A83-14512
- Field ionization of deep levels in semiconductors with applications to Hg/1-x/Cd/x/ Te p-n junctions p 156 A83-16089
- Deep impurity trapping concepts for power semiconductor devices p 170 N83-15877

SEMICONDUCTOR DIODES

- Changes in photovoltaic and dark electrical properties of hydrogenated amorphous silicon diodes induced by forward bias carrier injection p 34 A83-16021

SEMICONDUCTOR JUNCTIONS

- Exactly soluble model for a solar cell with nonlinear recombination p 24 A83-11811
- Design of a 13% efficient n-GaAs/1-x/P/x/ semiconductor-liquid junction solar cell p 36 A83-17801
- Low cost solar array project cell and module formation research area. Process research of non-CZ silicon material [NASA-CR-169632] p 59 N83-14671

SEMICONDUCTORS (MATERIALS)

- Direct-gap group IV semiconductors based on tin p 22 A83-10294
- Status of new thin-film photovoltaic technologies p 23 A83-11510
- Polycrystalline silicon availability for photovoltaic and semiconductor industries p 28 A83-13648
- Layered transition metal thiophosphates /MPX3/ as photoelectrodes in photoelectrochemical cells p 33 A83-15483
- Large grain polycrystalline silicon from rice husk — for terrestrial solar cells p 33 A83-15492
- Flat-plate collector research area. Silicon material task p 41 N83-10519
- Large-area silicon sheet task p 41 N83-10520
- Investigation of new solar cells. Part A. Novel semiconductors and their suitability. Part B. Polycrystalline MIS diodes [BMFT-FB-T-82-103] p 48 N83-10632
- Fuel and electricity generation from illumination of inorganic interfaces [AD-A119305] p 67 N83-14741
- Sensitivity
- Sensitivities of internal combustion automotive engines to variations in fuel properties [PB82-194961] p 84 N83-10430

SEPARATION

- Desulfurization of coal by means of the Batac-jig [BMFT-FB-T-82-100] p 82 N83-10145

SEPARATORS

- Polyvinyl alcohol membranes as alkaline battery separators [NASA-TM-82961] p 119 N83-10135
- Advanced alkaline electrolysis cell development. Development of electrolysis operation cell separator for 1250C [DE82-020697] p 76 N83-13593
- Development of improved separators for alkaline zinc batteries [AD-A119150] p 168 N83-14743
- Development and evaluation of polyvinyl-alcohol blend polymer films as battery separators [NASA-TM-82981] p 167 N83-15372

SERVICE LIFE

- Electron conductivity of the active masses of lead acid batteries during discharge and permanent service [BMFT-FB-T-82-078] p 161 N83-10619
- QAO-3 end of mission power subsystem evaluation [NASA-TM-83959] p 181 N83-11580
- Aspects of end of life design for solar cells p 63 N83-14706

SERVOCONTROL

- Automotive Stirling Engine Mod 1 Design Review, volume 2 [NASA-CR-167936] p 127 N83-10991

SEWAGE

- Sewage sludge as a supplementary utility boiler fuel p 88 N83-10590

SEWAGE TREATMENT

- Sewage sludge as a supplementary utility boiler fuel p 88 N83-10590

SHADOWS

- Determination of the interference between the elements of a central-receiver solar system p 24 A83-11848
- Solar availability in cities and towns. A computer model [PB82-202201] p 49 N83-11608

SHALE OIL

- Environmental monitoring of the Athabasca Oil Sands using Landsat data p 79 A83-11988
- Development of newer methods for the isolation and identification of certain components found in complex mixtures derived from energy sources and the determination of their toxicity via bioassay systems [DE82-019043] p 81 N83-10140
- Refining of military jet fuels from shale oil. Part 1. Preliminary process design, economic and yield optimization, and computer modeling [AD-A117511] p 83 N83-10210
- An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 4. Production of samples of military fuels from raw shale oils [AD-A117526] p 83 N83-10211
- Technical study on the possibilities of oil shale combustion in a fluidized bed furnace including cost estimates for a plant to be built [BMFT-FB-T-82-085] p 90 N83-10623
- Fluidized-bed pyrolysis of oil shale. Oil yield, composition, and kinetics [DE82-021010] p 97 N83-12571
- Characterization of diesel emissions from operation of a light-duty diesel vehicle on alternate source diesel fuels [PB82-232448] p 101 N83-13281
- Installation of a diesel engine combustion/ignition evaluation facility [AD-A119610] p 104 N83-14189
- Material properties of Green River oil shale [DE82-003271] p 111 N83-15801
- Oil-shale program [DE82-900588] p 111 N83-15951
- Reaction kinetics and diagnostics for oil-shale retorting [DE82-001598] p 112 N83-15952
- Ideas for implementing air-quality studies in the western Rocky Mountain region [DE82-000063] p 22 N83-15960

SHALES

- Physical and chemical characterization of Devonian gas shale [DE82-002560] p 111 N83-15802
- Shearing
- Evaluation of the Kioswall longwall mining system [DE82-015881] p 89 N83-10606
- Longwall shearer tracking system [NASA-CASE-MFS-25717-1] p 107 N83-14607

SHELLS (STRUCTURAL FORMS)

- Analysis of target implosion irradiated by proton beam. 1. Beam interaction with target plasma [IPPJ-612] p 134 N83-13989

SHOCK WAVE PROPAGATION

- Detonation driven induction generators with parallel and antiparallel external and induced magnetic fields p 118 A83-17371

SHORT CIRCUITS

- Theoretical temperature dependence of short-circuit current of drift-field solar cells p 24 A83-11991
- Study of electrical faults in magnetohydrodynamic Faraday generators p 116 A83-16106
- Thermal battery systems for ordnance fuzing [AD-A119155] p 163 N83-13590
- The effect of different solar simulators on the measurement of short-circuit current temperature coefficients p 70 N83-15821

SILANES

- Thermal reactor — liquid silicon production from silane gas [NASA-CASE-NPO-14369-1] p 75 N83-10501
- Union Carbide Corp. polysilicon status and plans p 40 N83-10508

SILICON

- CW-laser annealed solar cells p 23 A83-10638
- A study of silicon and GaAs solar cells, and their optical coupling by means of a dichroic mirror — French thesis p 23 A83-11764
- Polycrystalline silicon availability for photovoltaic and semiconductor industries p 28 A83-13648
- Review — Solar-grade silicon p 29 A83-13677
- Role of impurities in silicon solar cell performance p 32 A83-15457
- Large grain polycrystalline silicon from rice husk — for terrestrial solar cells p 33 A83-15492
- Changes in photovoltaic and dark electrical properties of hydrogenated amorphous silicon diodes induced by forward bias carrier injection p 34 A83-16021
- Effect of hydrogen on the deposition rate for planar RF magnetron sputtering of hydrogenated amorphous silicon p 35 A83-16082
- Thermal reactor — liquid silicon production from silane gas [NASA-CASE-NPO-14369-1] p 75 N83-10501
- FSAs future role p 39 N83-10507
- Union Carbide Corp. polysilicon status and plans p 40 N83-10508
- Advanced Czochralski ingot growth p 40 N83-10509
- PV history: Lessons for the future p 40 N83-10514
- Large-area silicon sheet task p 41 N83-10520
- The effect of Ta2O5 on the interaction between silicon and its contact metallization [NASA-TM-82948] p 45 N83-10554
- Radiation damage in front and back illuminated high resistivity silicon solar cells [NASA-TM-82965] p 48 N83-10962
- Electrolytic deposition of low-cost, high-purity polysilicon suitable for use in solar-cell devices [DE82-012428] p 51 N83-12552
- Price estimates for the production of wafers from silicon ingots [NASA-CR-169517] p 55 N83-13583
- Summary of flat-plate solar array project documentation. Abstracts of published documents, 1975 to June 1982 [NASA-CR-169518] p 56 N83-13586
- Electrochemical storage cell based on polycrystalline silicon [DE82-020595] p 56 N83-13600
- The reduction of radiation damage in solar cells. A study of radiation defects in silicon, first phase [CESR-81-985] p 57 N83-13626
- Low cost solar array project cell and module formation research area. Process research of non-CZ silicon material [NASA-CR-169632] p 59 N83-14671
- Large-area sheet task advanced dendritic web growth development [NASA-CR-169637] p 59 N83-14675
- Stress studies in EPG [NASA-CR-169640] p 60 N83-14677
- Analysis of defect structure in silicon. Characterization of samples from UCP ingot 5848-13C [NASA-CR-169617] p 60 N83-14680
- Advanced Czochralski silicon growth technology for photovoltaic modules [NASA-CR-169661] p 61 N83-14685
- Large area low-cost space solar cell development p 62 N83-14699
- Thin cell development and testing — solar cells p 62 N83-14702
- Optimization of silicon solar cells for solar generators with concentration p 63 N83-14707
- Effects of processing and dopant on radiation damage removal in silicon solar cells p 63 N83-14708
- The reduction of radiation damage in space solar cells. A study of radiation defects in silicon (+) p 63 N83-14710

SILICON ALLOYS

- Recent developments in thin silicon solar cells p 68 N83-15809
- Basis for equivalent fluence concept in space solar cells p 71 N83-15827
- Grown-in defects and defects produced by 1-Me electron irradiated in Al_{0.3}Ga_{0.7}As P-N junction solar cells p 71 N83-15828
- Progress in developing high performance solar blankets and arrays p 71 N83-15829
- GaAs solar cells p 72 N83-15836
- Radiation damage p 72 N83-15837
- Deep impurity trapping concepts for power semiconductor devices p 170 N83-15877

SILICON ALLOYS

- Recent advances in amorphous silicon solar cells p 34 A83-15510
- The residual voltage in fast electrophotography of a-SiH_x/x/ p 34 A83-15511

SILICON CARBIDES

- Valency control of glow discharge produced a-SiC:H and its application to heterojunction solar cells p 28 A83-13649

SILICON COMPOUNDS

- Investigation of the hydrochlorination of SiCl₄ [NASA-CR-169622] p 60 N83-14682

SILICON CONTROLLED RECTIFIERS

- A lightweight electronically commutated dc motor for electric passenger vehicles [NASA-CR-165601] p 119 N83-10348

SILICON FILMS

- Properties of amorphous silicon solar cells p 25 A83-12321
- Recent advances in amorphous silicon solar cells p 34 A83-15510
- Hydrogenated a-Si_x/Ge_{1-x}/ - A potential solar cell material p 34 A83-15871

SILICON JUNCTIONS

- Recent progress of amorphous-silicon solar-cell technology in Japan p 24 A83-11803
- Planar multijunction high voltage solar cell chip p 30 A83-13923
- Development of the spherical silicon solar cell p 36 A83-17347

SILVER

- Microstructural analysis of solar cell welds p 72 N83-15833

SILVER ZINC BATTERIES

- Polyvinyl alcohol membranes as alkaline battery separators [NASA-TM-82961] p 119 N83-10135

SIMULATION

- Pressure-swinging underground gasification. Theoretical and experimental investigations of gasification, phase 2 [BMFT-FB-T-82-066] p 89 N83-10615

SIMULATORS

- Alternative electric generation impact simulator [PB82-180324] p 3 N83-10302

SINGLE CRYSTALS

- A survey of spectral response measurements for photovoltaic devices [DE82-006221] p 50 N83-12545
- Large-area sheet task advanced dendritic web growth development [NASA-CR-169624] p 58 N83-14665
- Advanced Czochralski silicon growth technology for photovoltaic modules [NASA-CR-169681] p 61 N83-14685

SITE SELECTION

- Applications of remote sensing to wind power facility siting p 77 A83-10041
- A diagnostic model for estimating winds at potential sites for wind turbines p 79 A83-12954
- An assessment of wind energy resource for northwestern California p 80 A83-18456
- Environmental Research Guiding Committee report [PB82-220070] p 6 N83-10661
- Geologic studies of geopressured and hydropressured zones in Texas. Test well site selection [PB82-220542] p 94 N83-11653
- Wind Energy Conversion Devices [VKI-LS-1981-8] p 130 N83-12526
- Site characteristics for wind energy conversion devices p 130 N83-12528
- Candidate wind-turbine-generator site. Data summary [DE82-020416] p 99 N83-12785
- Development of a slide program describing a site selection process for small Wind-Energy-Conversion Systems (SWECS) [DE82-017394] p 99 N83-12788
- The 40kW fuel cell field test support [PB82-231630] p 133 N83-13633
- Parametric study of geohydrologic performance characteristics for nuclear-waste repositories [DE82-003145] p 17 N83-13973

- Energy resource recovery facility for Kent and Sussex counties, Delaware [DE82-002539] p 19 N83-14753
- The wind characteristics program p 111 N83-15910
- Test status and experience with the 7.5 megawatt MOD-2 wind turbine cluster p 147 N83-15918

SIZE DISTRIBUTION

- Pore size engineering applied to starved electrochemical cells and batteries [NASA-TM-82893] p 119 N83-10134

SLAGS

- Materials technology for coal-conversion processes [DE82-004036] p 96 N83-12253

- Three-dimensional current distribution in coal-fired MHD channels [DE82-016958] p 99 N83-13005

SLICING

- Price estimates for the production of wafers from silicon ingots [NASA-CR-169517] p 55 N83-13583

SLIP CASTING

- High-temperature ceramic heat exchanger element for a solar thermal receiver p 44 N83-10543

SLUDGE

- Sewage sludge as a supplementary utility boiler fuel p 88 N83-10590
- Analysis of treated sludges and associated leachates from coal-conversion facilities [DE82-001488] p 103 N83-13650

SLURRIES

- Development of enhanced heat transfer/transport/storage slurries for thermal-system improvement [DE82-021236] p 158 N83-12387
- Design and preparation of new, highly active Fischer-Tropsch catalysts [DE82-003670] p 105 N83-14202
- Program of basic research on the utilization of coal-water mixture fuels [DE82-002232] p 106 N83-14299
- Catalytic liquefaction of biomass [DE82-003329] p 108 N83-14752
- Modification of feed/effluent flow work exchangers for slurry service and power recovery in coal liquefaction processes [DE82-004114] p 110 N83-15499

SODIUM

- Development of the sodium/sulfur batteries, phase 2 [BMFT-FB-T-82-142] p 162 N83-11599

SODIUM SULFATES

- The effect of crystal size on the thermal energy storage capacity of thickened Glauber's salt p 160 A83-18562

SODIUM SULFUR BATTERIES

- Production technology of an electrolyte for Na/S batteries [BMFT-FB-T-82-065] p 161 N83-10614

SODIUM VAPOR

- Startup conditions of alkali-metal vaporization from rectangular channels --- in heat pipes p 157 A83-18446

SOILS

- Thermal analysis of the position of the freezing front around an LNG in-ground storage tank with a heat barrier p 110 N83-15712
- Study of the freezing pressure acting on a shaft lining p 110 N83-15732

SOLAR ARRAYS

- Microprocessor control of power sharing and solar array peak power tracking for high power /2.5 kW/ switching power converters p 23 A83-11007
- Optimal sun-alignment techniques of large solar arrays in electric propulsion spacecraft [AIAA PAPER 82-1898] p 25 A83-12475
- Luminescent solar concentrators - A review p 28 A83-13581
- Performance characteristics of 350 kW photovoltaic power system for Saudi Arabian villages p 28 A83-13647
- Use of test structures in the production of CdS/Cu₂S photovoltaic devices p 32 A83-15455
- Experience with specifications applicable to certification --- of photovoltaic modules for large-scale application p 32 A83-15463
- Environmentally induced discharges in a solar array p 36 A83-17493
- Flat Plate Solar Array Project. Proceedings of the 20th Project Integration Meeting [NASA-CR-169370] p 39 N83-10505
- FSAs future role p 39 N83-10507
- Block 5 module design summary p 40 N83-10510
- Central-station applications. System and subsystem research activities p 40 N83-10511
- Roof-top applications p 40 N83-10515
- Flat-plate collector research area. Silicon material task p 41 N83-10519

- Engineering sciences area and module performance and failure analysis area p 41 N83-10523
- User handbook for block IV silicon solar cell modules [NASA-CR-169431] p 45 N83-10552
- Photovoltaic module encapsulation design and materials selection, volume 1, abridged [NASA-CR-169372] p 45 N83-10553
- Intermediate photovoltaic system application experiment operational performance report. Volume 7. Beverly High School, Beverly, Mass [DE82-015790] p 46 N83-10607
- OAO-3 end of mission power subsystem evaluation [NASA-TM-83959] p 161 N83-11580
- Intermediate photovoltaic system application experiment operational performance report. Volume 10. Newman Power Station, El Paso, Tex [DE82-015791] p 48 N83-11588
- Intermediate photovoltaic system application experiment operational performance report. Volume 10. Lovington Square Shopping Center, Lovington, N. Mex. (USA) [DE82-015792] p 49 N83-11589
- Analysis of small commercial photovoltaic applications [DE82-020924] p 51 N83-12548
- Data report for the Southwest Residential Experiment Station, Mar 1982 [DE82-020400] p 52 N83-12556
- Summary of flat-plate solar array project documentation. Abstracts of published documents, 1975 to June 1982 [NASA-CR-169518] p 56 N83-13586
- Performance criteria for photovoltaic energy systems, volume 1 [DE82-021958] p 56 N83-13596
- Performance criteria for photovoltaic energy systems, volume 2 [DE82-021683] p 56 N83-13597
- Investigation of power processing technology for spacecraft applications [AD-A118644] p 135 N83-14151
- Investigation of test methods, material properties and processes for solar cell encapsulants [NASA-CR-169636] p 60 N83-14676
- Development of technique for AR coating nickel and copper metallization of solar cells FPS project product development [NASA-CR-169616] p 60 N83-14679
- Development of photovoltaic array and module safety requirements [NASA-CR-169641] p 60 N83-14681
- Investigation of the hydrochlorination of SiCl₄ [NASA-CR-169622] p 60 N83-14682
- Low Earth orbit blanket technologies for the power range of 15-60 kW p 61 N83-14696
- Advanced rigid array --- satellite solar arrays p 62 N83-14697
- Module technique of 5 x 5 cm(2) solar cells --- for spacecraft p 62 N83-14698
- Large area low-cost space solar cell development p 62 N83-14699
- TV-SAT solar array p 64 N83-14714
- Further developments of the ECS solar array p 64 N83-14715
- NASA solar array flight experiment p 65 N83-14722
- Analytical prediction of the dynamic in-orbit behavior of large flexible solar arrays p 65 N83-14723
- Space Telescope. Solar panel assembly thermal test analysis p 65 N83-14724
- Extendible and retractable masts for solar array developments p 65 N83-14725
- CMX-50. A new ultra thin solar cell cover for lightweight arrays p 66 N83-14726
- Ultra lightweight solar array technology --- spacecraft power p 66 N83-14729
- The design of the L-SAT solar array p 66 N83-14730
- Solar arrays for small scientific satellites p 66 N83-14731
- ARABSAT solar array p 66 N83-14733
- Soldered solar arrays p 67 N83-14735
- Progress and development status of the Space Telescope solar array p 67 N83-14736
- Future developments and applications for the Space Telescope solar array p 67 N83-14737
- Anti-static coat for solar arrays p 67 N83-14738
- Progress in developing high performance solar blankets and arrays p 71 N83-15829
- Miniaturized Cassegrainian concentrator concept demonstration p 71 N83-15830
- The course of solar array welding technology development p 72 N83-15831
- Evaluation of solar cell welds by scanning acoustic microscopy p 72 N83-15834
- GaAs solar cells p 72 N83-15836
- Interaction between the SPS solar power satellite solar array and the magnetospheric plasma p 73 N83-15868

SUBJECT INDEX

SUBJECT INDEX

Flat plate photovoltaic power systems: Description, design and cost [AD-A120814] p 73 N83-15902

SOLAR BLANKETS

NASA-OAST program in photovoltaic energy conversion p 68 N83-15807

Blanket technology p 72 N83-15838

SOLAR CELLS

CW-laser annealed solar cells p 23 A83-10638

On the formula for the upper limit of photovoltaic solar energy conversion efficiency p 23 A83-10699

Status of new thin-film photovoltaic technologies p 23 A83-11510

Determination of the integral currents of solar cells using an improved method of spectral sensitivity measurement p 23 A83-11696

A study of silicon and GaAs solar cells, and their optical coupling by means of a dichroic mirror — French thesis p 23 A83-11764

Recent progress of amorphous-silicon solar-cell technology in Japan p 24 A83-11803

Exactly soluble model for a solar cell with nonlinear recombination p 24 A83-11811

Theoretical temperature dependence of short-circuit current of drift-field solar cells p 24 A83-11991

Research on the characteristic parameters of thermophotovoltaic /TPV/ converter performance p 24 A83-12029

Process for high photocurrent in IBC solar cells — Interdigitated Back Contact p 24 A83-12059

Meaning of the photovoltaic band gap for amorphous semiconductors p 25 A83-12287

Self-annealed ion implanted solar cells p 25 A83-12290

Properties of amorphous silicon solar cells p 25 A83-12321

The influence of the interface state on the properties of solar cell semiconductor electrodes p 26 A83-13473

Solar cell device physics — Book p 27 A83-13501

Calibration of solar cells by the reference cell method - The spectral mismatch problem p 28 A83-13580

Performance characteristics of 350 kW photovoltaic power system for Saudi Arabian villages p 28 A83-13647

Polycrystalline silicon availability for photovoltaic and semiconductor industries p 28 A83-13648

Valency control of glow discharge produced a-SiC and its application to heterojunction solar cells p 28 A83-13649

Review - Solar-grade silicon p 29 A83-13677

50 per cent more output power from an albedo-collecting flat panel using bifacial solar cells p 29 A83-13700

Polycrystalline p- WSe_2 as photocathode in an electrochemical solar cell p 29 A83-13702

Optical absorption coefficient and minority carrier diffusion length measurements in low-cost silicon solar cell material p 30 A83-13922

Planar multijunction high voltage solar cell chip p 30 A83-13923

A study of different techniques for cooling solar cells in centralized concentrator photovoltaic power plants — French thesis p 30 A83-14109

A new method for experimental determination of the series resistance of a solar cell p 30 A83-14512

A p-n heterojunction model for the thin-film $\text{CuInSe}_2/\text{CdS}$ solar cell p 30 A83-14513

Commercial Photovoltaics Measurements Workshop, Vail, CO, July 27-29, 1981, Proceedings p 32 A83-15452

A manufacturer's perspective of measurement equipment needs for the photovoltaics industry p 32 A83-15454

Role of impurities in silicon solar cell performance p 32 A83-15457

Polycrystalline lanthanum rhodate and lutetium rhodate photoelectrodes for liquid junction solar cells p 33 A83-15480

Influence of deposition rate on the character of electrodeposited CdSe used for photoelectrochemical cells p 34 A83-15499

Schottky revisited — model limitations and steps for extending treatment to solar cell structures p 34 A83-15509

Recent advances in amorphous silicon solar cells p 34 A83-15510

Hydrogenated a-Si/x/Ge/1-x/ - A potential solar cell material p 34 A83-15871

Transport mechanisms for Mg/Zn P_2 junctions p 35 A83-16071

Heat-treatment studies on thin-film $\text{CdS}/\text{Cu}/\text{S}$ solar cells p 35 A83-16084

Evaluation of thermophotovoltaic conversion efficiency p 35 A83-16086

The properties and production of solar cells p 35 A83-16183

Photovoltaic prospects in Europe p 35 A83-16184

Hot-electron luminescence in aged electrodeposited CdSe liquid-junction solar cell p 36 A83-16948

Development of the spherical silicon solar cell p 36 A83-17347

Thin film polycrystalline Si p-n junction solar cells with preferential doping p 36 A83-17768

On the open-circuit voltage of a Schottky-barrier MIS solar cell p 36 A83-17770

Design of a 13% efficient n-GaAs/1-x/P/x/ semiconductor-liquid junction solar cell p 36 A83-17801

Stability of SnO_2 thin films used for photovoltaic devices p 38 A83-18563

A simple parameter measurement system for solar cells p 38 A83-18825

Advanced Czochralski ingot growth p 40 N83-10509

Photovoltaic research needs industry perspective p 40 N83-10516

Research possibilities? No! Needs for research to make PV solar energy utilization broadly competitive p 40 N83-10517

Evaluation of advanced R and D topics in photovoltaics p 41 N83-10518

Cell and module formation research area p 41 N83-10522

User handbook for block IV silicon solar cell modules [NASA-CR-169431] p 45 N83-10552

The effect of Ta_2O_5 on the interaction between silicon and its contact metallization [NASA-TM-82948] p 45 N83-10554

Evaluation of electrode shape and nondestructive evaluation method for welded solar cell interconnects [NASA-TM-82966] p 45 N83-10555

The fabrication and evaluation of a silicon photovoltaic cell with a directly nitrided tunnel insulator p 45 N83-10564

Methods for investigating the properties of polycrystalline silicon p-n junction solar cells p 46 N83-10565

Design and development of a high-concentration photovoltaic concentrator [DE82-015673] p 46 N83-10597

Intermediate photovoltaic system application experiment operational performance report. Volume 7 Beverly High School, Beverly, Mass [DE82-015790] p 46 N83-10607

Research and development on a MIS thin film solar cell made of amorphous silicon [BMFT-FB-T-82-079] p 47 N83-10620

Investigation of new solar cells. Part A. Novel semiconductors and their suitability Part B Polycrystalline MIS diodes [BMFT-FB-T-82-103] p 48 N83-10632

Radiation damage in front and back illuminated high resistivity silicon solar cells [NASA-TM-82965] p 48 N83-10962

Efficiency-improvement study for GaAs solar cells [DE82-016410] p 48 N83-11585

Analysis of small commercial photovoltaic applications [DE82-020924] p 51 N83-12548

High-intensity solar cells [DE82-020420] p 51 N83-12550

Electrolytic deposition of low-cost, high-purity polysilicon suitable for use in solar-cell devices [DE82-012428] p 51 N83-12552

Data report for the Southwest Residential Experiment Station, Mar 1982 [DE82-020400] p 52 N83-12556

Solar-cell testing and evaluation [DE82-016179] p 52 N83-12562

PV module degradation-analysis [DE82-021123] p 53 N83-12570

Solar cell having improved back surface reflector [NASA-CASE-LEW-13620-1] p 55 N83-13579

Price estimates for the production of wafers from silicon ingots [NASA-CR-169517] p 55 N83-13583

Performance criteria for photovoltaic energy systems, volume 1 [DE82-021958] p 56 N83-13596

Performance criteria for photovoltaic energy systems, volume 2 [DE82-021683] p 56 N83-13597

The reduction of radiation damage in solar cells. A study of radiation defects in silicon, first phase [CESR-81-985] p 57 N83-13626

Large-area sheet task advanced dendritic web growth development [NASA-CR-169624] p 58 N83-14665

Investigation of reliability attributes and accelerated stress factors on terrestrial solar cells [NASA-CR-169620] p 59 N83-14670

SOLAR CELLS

Low cost solar array project cell and module formation research area Process research of non-CZ silicon material [NASA-CR-169632] p 59 N83-14671

Development of a polysilicon process based on chemical vapor deposition, phase 1 [NASA-CR-169633] p 59 N83-14673

Development of an all-metal thick film cost effective metallization system for solar cells [NASA-CR-169635] p 59 N83-14674

Large-area sheet task advanced dendritic web growth development [NASA-CR-169637] p 59 N83-14675

Development of technique for AR coating nickel and copper metallization of solar cells FPS project product development [NASA-CR-169616] p 60 N83-14679

Analysis of defect structure in silicon Characterization of samples from UCP ingot 5848-13C [NASA-CR-169617] p 60 N83-14680

Advanced Czochralski silicon growth technology for photovoltaic modules [NASA-CR-169661] p 61 N83-14685

Solar cell radiation handbook [NASA-CR-169662] p 61 N83-14687

Heat transparent high intensity high efficiency solar cell [NASA-CASE-LEW-12892-1] p 61 N83-14692

Module technique of 5 x 5 cm(2) solar cells — for spacecraft p 62 N83-14698

Large area low-cost space solar cell development p 62 N83-14699

Nonlinear algorithms application to irradiated solar cell parameters evaluation p 62 N83-14700

Lift off A very fine front metallization geometry technique for high efficiency solar cells p 62 N83-14701

Thin cell development and testing — solar cells p 62 N83-14702

A family of thin high efficiency silicon solar cells p 62 N83-14703

Electrophoretic Cds/Cu S_2 solar cells for space applications p 63 N83-14704

On the cause of the flat-spot phenomenon observed in silicon solar cells at low temperatures and low intensities p 63 N83-14705

Aspects of end of life design for solar cells p 63 N83-14706

Optimization of silicon solar cells for solar generators with concentration p 63 N83-14707

Effects of processing and dopant on radiation damage removal in silicon solar cells p 63 N83-14708

Omnidirectional proton radiation of thin and thick solar cells p 63 N83-14709

The reduction of radiation damage in space solar cells A study of radiation defects in silicon (+) p 63 N83-14710

Electron and photon degradation of boron doped FZ silicon solar cells p 64 N83-14711

Retrospect of solar cell development in West Germany p 64 N83-14712

TV-SAT solar array p 64 N83-14714

Primary calibration of high efficiency solar cells A comparison of 1980 data from CNES, Nasa (Lewis), JPL and RAE p 64 N83-14717

Announcement of an opportunity for space calibration of solar cells p 65 N83-14719

Loss currents of solar cells under Low Earth Orbit (LEO) conditions p 65 N83-14721

CMX-50 A new ultra thin solar cell cover for lightweight arrays p 66 N83-14726

Textured solar cell covers for light weight and high performance p 66 N83-14728

Determination of optimum sunlight concentration level in space for 3-5 cascade solar cells p 66 N83-14732

Residential photovoltaic experiment station data system [DE82-001646] p 68 N83-14762

New silicon cell design concepts for 20 percent AMI efficiency p 68 N83-15808

Recent developments in thin silicon solar cells p 68 N83-15809

Large area space solar cell assemblies p 68 N83-15810

Simulated space flight testing of commercial terrestrial silicon cells p 69 N83-15811

Diffusion length measurements in solar cells. An analysis and comparison of techniques p 69 N83-15812

Progress toward cascade cells made by OM-VPE — organometallic vapor phase epitaxy p 69 N83-15813

Determination of optimum sunlight concentration level in space for 3-5 cascade solar cells p 69 N83-15814

Air Force development of thin GaAs solar cells p 69 N83-15816

- Progress toward thin-film GaAs solar cells using a single-crystal Si substrate with a Ge interlayer p 69 N83-15817
- Diffused P+-N solar cells in bulk GaAs p 69 N83-15818
- GaAs solar cells for concentrator systems in space p 70 N83-15820
- The effect of different solar simulators on the measurement of short-circuit current temperature coefficients p 70 N83-15821
- Defects and annealing studies in 1-Me electron irradiated (AlGa)As-GaAs solar cells p 70 N83-15822
- Defect behavior in electron-irradiated boron- and gallium-doped silicon p 70 N83-15823
- Cold crucible Czochralski for solar cells p 70 N83-15824
- Microdistribution of oxygen in silicon and its effects on electronic properties p 71 N83-15825
- Radiation damage and annealing in large area n+/p/p+ GaAs shallow homojunction solar cells p 71 N83-15826
- Basis for equivalent fluence concept in space solar cells p 71 N83-15827
- Grown-in defects and defects produced by 1-Me electron irradiated in AlO₃Ga₂₀7As P-N junction solar cells p 71 N83-15828
- Progress in developing high performance solar blankets and arrays p 71 N83-15829
- Miniaturized Cassegrainian concentrator concept demonstration p 71 N83-15830
- The course of solar array welding technology development p 72 N83-15831
- A preliminary evaluation of a potential space worth encapsulant p 72 N83-15832
- Microstructural analysis of solar cell welds p 72 N83-15833
- Evaluation of solar cell welds by scanning acoustic microscopy p 72 N83-15834
- Silicon research and technology p 72 N83-15835
- GaAs solar cells p 72 N83-15836
- Radiation damage p 72 N83-15837
- Blanket technology p 72 N83-15838
- Flat plate photovoltaic power systems Description, design and cost p 73 N83-15902
- [AD-A120814] p 73 N83-15902
- Lifetime and effective surface recombination velocity measurements in high-efficiency Si solar cells [DE81-030361] p 74 N83-15953
- SOLAR COLLECTORS**
- Reflections on solar collectors at elevated temperatures /260-1000 C/ --- French thesis p 23 A83-11766
- A methodology of evaluation and design of fields of focusing heliostats --- French thesis p 24 A83-11768
- Determination of the interference between the elements of a central-receiver solar system p 24 A83-11848
- Mathematical model for a noniterative optimization of each system for exploiting solar energy p 24 A83-11849
- Optical analysis of solar energy tubular absorbers p 25 A83-12596
- Thermal response of solar receiver aperture plates during sun walk-off [ASME PAPER 82-HT-33] p 25 A83-12791
- Thermal storage performance calculations by closed form and finite difference solutions [ASME PAPER 82-HT-52] p 26 A83-12799
- High-temperature ceramic heat exchanger element for a solar thermal receiver p 26 A83-13476
- Transient performance of evacuated tubular solar collectors p 27 A83-13478
- An experimental investigation of a stationary reflector/tracking absorber solar collector at intermediate temperatures p 27 A83-13479
- Incident angle modifiers for flat-plate solar collectors - Analysis of measurement and calculation procedures p 27 A83-13480
- Analysis of two-phase flow solar collectors with application to heat pumps p 27 A83-13481
- Hybrid thermoelectric solar collector design and analysis p 27 A83-13482
- Luminescent solar concentrators - A review p 28 A83-13581
- Collection of solar energy at specified output temperature p 28 A83-13582
- A design method for closed loop solar energy systems with concentrating collectors p 28 A83-13583
- Thermal and optical analysis of an evacuated circular cylindrical concentrating collector p 29 A83-13697
- Optimization of parabolic trough solar collectors p 29 A83-13699
- 50 per cent more output power from an albedo-collecting flat panel using bifacial solar cells p 29 A83-13700
- A method of rating solar collectors p 29 A83-13701
- Effect of off-south orientation on the performance of collector reflector system in India p 30 A83-14871
- Testing of the energy module of a parabolocylindrical solar installation p 31 A83-15130
- Automatic methods for the adjustment of faceted solar-energy concentrators and heliostats p 31 A83-15131
- Rapid simulated solar absorptance measurements on flat or curved surfaces p 32 A83-15476
- Black chrome solar selective coatings optimized for high temperature applications p 33 A83-15479
- Optical properties of gold-magnesia selective cermetes --- for solar collectors p 33 A83-15482
- On the properties of the superplastic aluminum-calcium alloy as material for solar collectors p 34 A83-15496
- A parametric analysis of the performances of a linear collectors' network of a solar power plant p 36 A83-18139
- An analytical investigation of mass flow, pressure and temperature in a flat-plate solar collector p 37 A83-18452
- Solar energy storage by the reversible reaction - N₂O₄ yields 2NO₂ - Theoretical and experimental results p 37 A83-18554
- Universal graph for optimal dimensions of solar collector plate p 37 A83-18557
- A new evacuated CPC collector tube --- Compound Parabolic Concentrator p 37 A83-18558
- Transmittance of reflected diffuse radiation --- for solar collectors p 38 A83-18564
- Studies on radiation intensity distribution in the focus of compound parabolic concentrators p 38 A83-18565
- Axisymmetric reflectors of the stepped spherical type p 38 A83-18194
- Prospects for the construction of solar furnaces for industry p 38 A83-19236
- Analysis of thermal comfort in a passive solar heated residence [PB82-180142] p 39 N83-10297
- An experimental investigation of convective losses from solar receivers [UILU-ENG-81-4003] p 39 N83-10500
- Flat-plate collector research area Silicon material task p 41 N83-10519
- Parabolic Dish Solar Thermal Power Annual Program Review, proceedings [NASA-CR-169385] p 42 N83-10525
- Development status of the PDC-1 Parabolic Dish Concentrator p 42 N83-10526
- Acurex Parabolic Dish Concentrator (PDC-2) p 42 N83-10527
- The PKI collector p 42 N83-10528
- Thin film concentrator panel development p 42 N83-10529
- A transmittance-optimized, point-focus Fresnel lens solar concentrator p 42 N83-10530
- The small community solar thermal power experiment p 43 N83-10531
- Development status of the small community solar power system p 43 N83-10532
- Verification testing of the PKI collector at Sandia National Laboratories, Albuquerque, New Mexico p 43 N83-10534
- PKI solar thermal plant evaluation at Capitol Concrete Products, Topeka, Kansas p 43 N83-10535
- High-temperature ceramic heat exchanger element for a solar thermal receiver p 44 N83-10543
- Ceramic high temperature receiver design and tests p 44 N83-10544
- Garrett solar Brayton engine/generator status p 44 N83-10545
- Configuration selection study for isolated loads using parabolic dish modules p 45 N83-10548
- An economic evaluation of solar energy p 45 N83-10549
- Panel discussions Industrial support sector requirements p 4 N83-10550
- Design and development of a high-concentration photovoltaic concentrator [DE82-015673] p 46 N83-10597
- Results of testing a development module of the second-generation E-systems concentrating photovoltaic-thermal module [DE82-015671] p 46 N83-10598
- Designing the manifold piping for parabolic-trough-collector fields [DE82-015998] p 46 N83-10599
- Solar energy conversion based on the principle of fluorescent collectors [BMFT-FB-T-82-081] p 47 N83-10621
- Development of large scale production methods for components of solar energy collection. Transparent glass covers and their connection to the collector system [BMFT-FB-T-82-083] p 47 N83-10622
- Tests with concentrating collectors --- construction, evaluation and qualification of parabolic solar absorbers [BMFT-FB-T-82-104] p 47 N83-10626
- The luminescent solar concentrator p 48 N83-10902
- Evaluation of solar-air-heating central-receiver concepts [DE82-016924] p 48 N83-11586
- Durability of solar collectors Experience from surveys of Swedish solar collector installations, 1979 - 1980 [PB82-188095] p 49 N83-11605
- Investigation of free-forced convection flows in cavity-type receivers [DE82-020118] p 49 N83-12386
- Stevens Home, Rancho Santa Fe, California. Solar-energy-system performance evaluation, Oct. 1981 - Apr 1982 [DE82-021698] p 50 N83-12538
- Kalin Home, Long Island, New York Solar-energy-system performance evaluation, Sep 1981-Mar 1982 [DE82-021701] p 50 N83-12539
- EROS Data Center, Sioux Falls, South Dakota. Solar-energy-system performance evaluation, Oct 1981 - Apr 1982 [DE82-021703] p 50 N83-12540
- Superior heat-transfer fluids for solar heating and cooling applications Results of acute oral-toxicity determinations [DE82-002758] p 52 N83-12560
- Solar-energy-system performance evaluation, Cathedral Square, Burlington, Vermont, July - December 1981 [DE82-016989] p 52 N83-12563
- Williamson Home, Ipswich, Mass solar-energy-system performance evaluation, Nov 1981 - Apr 1982 [DE82-021300] p 53 N83-12574
- Lo-Cal, Champaign, Illinois solar-energy-system performance evaluation, Jan 1982 - Apr 1982 [DE82-021299] p 53 N83-12575
- Isakson Home, Anoka, Minnesota solar-energy-system performance evaluation, Aug 1981 - Mar 1982 [DE82-021297] p 54 N83-12576
- Karasek Home, Blackstone, Massachusetts solar-energy-system performance evaluation, Nov 1981 - Mar 1982 [DE82-021302] p 54 N83-12577
- Wood Road School, Ballston Spa, New York solar-energy-system performance evaluation, November 1981 - April 1982 [DE82-021301] p 54 N83-12586
- Scatterplate flux mapping for solar concentrators [DE82-021359] p 54 N83-12588
- Contact stresses on a thin plate after large displacements to a full parabolic surface [DE82-005712] p 55 N83-13504
- Photovoltaic balance-of-system assessment [DE82-906429] p 57 N83-13622
- A comparison of unglazed flat plate liquid solar collector thermal performance using the ASHRAE Standard 96-1980 and modified BSE test procedures [PB82-237660] p 58 N83-13632
- A high temperature ceramic heat exchanger element for a solar thermal receiver [NASA-CR-169625] p 58 N83-14666
- Flat plate solar collectors [BMFT-FB-T-82-139] p 68 N83-14764
- GaAs solar cells for concentrator systems in space p 70 N83-15820
- Solar MHD systems with two-phase flow with magnetic liquid metal p 141 N83-15851
- Simplified solar fraction estimation for space and water heating at Department of Defense installations Appendix C Water heating nomographs [AD-A120014] p 73 N83-15904
- Simplified solar fraction estimation for space and water heating at Department of Defense installations Appendix B Space heating nomographs [AD-A120013] p 73 N83-15905
- SOLAR COOLING**
- Regulation of the diurnal variation of the cold productivity of an adsorption-type solar refrigeration system p 31 A83-15135
- Concerning the improvement of solar heating and cooling systems p 31 A83-15136
- Superior heat-transfer fluids for solar heating and cooling applications Results of acute oral-toxicity determinations [DE82-002758] p 52 N83-12560
- Acceptance-test report for El Toro Library solar heating and cooling demonstration project (SHAC no 1501) [DE82-019859] p 57 N83-13616
- Overview of passive solar design techniques [AD-A119993] p 73 N83-15899
- SOLAR ELECTRIC PROPULSION**
- Optimal sun-alignment techniques of large solar arrays in electric propulsion spacecraft [AIAA PAPER 82-1898] p 25 A83-12475

SUBJECT INDEX

SOLAR ENERGY

- Current topics of SPS realization from a European viewpoint p 156 A83-11283
- Transport of solar energy with optical fibres p 29 A83-13698
- A project for exploitation of a new form of solar energy the wind chill. I - The importance to the energy field. II - Application for building heat and electricity production p 38 A83-19238
- The solar assisted air-source heat pump system, part 1 [PB82-218439] p 39 N83-10288
- Application of the subatmospheric engine to solar thermal power p 45 N83-10548
- Potential benefits from a successful solar thermal program p 3 N83-10547
- Configuration selection study for isolated loads using parabolic dish modules p 45 N83-10548
- An economic evaluation of solar energy p 45 N83-10549
- Panel discussions Industrial support sector requirements p 4 N83-10550
- Solar thermal technologies benefits assessment. Objectives, methodologies and results for 1981 [NASA-CR-169373] p 4 N83-10551
- Results of testing a development module of the second-generation E-systems concentrating photovoltaic-thermal module p 46 N83-10598
- [DE82-015671] p 46 N83-10598
- Study of photovoltaic residential retrofits Volume 1 Executive summary p 46 N83-10605
- [DE82-015793] p 46 N83-10605
- Intermediate photovoltaic system application experiment operational performance report. Volume 7 Beverly High School, Beverly, Mass p 46 N83-10607
- [DE82-015790] p 46 N83-10607
- Intermediate photovoltaic system application experiment operational performance report. Volume 6 for Lovington Square Shopping Center, Lovington, NM p 47 N83-10608
- [DE82-015476] p 47 N83-10608
- Evaluation of solar-air-heating central-receiver concepts p 48 N83-11586
- [DE82-016924] p 48 N83-11586
- Solar availability in cities and towns A computer model [PB82-202201] p 49 N83-11608
- Harnessing the Sun for development Actions for consideration by the international community at the UN Conference on New and Renewable Sources of Energy for promoting the use of renewable energy in developing countries p 52 N83-12558
- [DE82-020273] p 52 N83-12558
- Solar-energy-system performance evaluation, Cathedral Square, Burlington, Vermont, July - December 1981 [DE82-016999] p 52 N83-12563
- Development of the trickle roof cooling and heating system Experimental plan p 57 N83-13615
- [DE82-019082] p 57 N83-13615
- Acceptance-test report for El Toro Library solar heating and cooling demonstration project (SHAC no 1501) [DE82-019859] p 57 N83-13616
- [DE82-019859] p 57 N83-13616
- Electric-utility solar-energy activities 1981 survey [DE82-905804] p 57 N83-13623
- [DE82-905804] p 57 N83-13623
- Technology assessment of solar thermal energy applications in wastewater treatment [PB82-229790] p 58 N83-13672
- [PB82-229790] p 58 N83-13672
- Overview of passive solar design techniques [AD-A119993] p 73 N83-15899
- [AD-A119993] p 73 N83-15899
- Simplified solar fraction estimation for space and water heating at Department of Defense installations [AD-A120012] p 74 N83-15906
- [AD-A120012] p 74 N83-15906
- ### SOLAR ENERGY ABSORBERS
- Optical analysis of solar energy tubular absorbers p 25 A83-12596
- [NASA-CR-169526] p 25 A83-12596
- Regulation of the diurnal variation of the cold productivity of an adsorption-type solar refrigeration system p 31 A83-15135
- [NASA-CR-169526] p 31 A83-15135
- Rapid simulated solar absorptance measurements on flat or curved surfaces p 32 A83-15476
- [NASA-CR-169526] p 32 A83-15476
- Black chrome solar selective coatings optimized for high temperature applications p 33 A83-15479
- [NASA-CR-169526] p 33 A83-15479
- Spectral selectivity of high-temperature solar absorbers. II Effects of interference p 33 A83-15488
- [NASA-CR-169526] p 33 A83-15488
- The optical properties of titanium nitrides and carbides Spectral selectivity and photothermal conversion of solar energy p 33 A83-15490
- [NASA-CR-169526] p 33 A83-15490
- An investigation of deposition parameter dependence of optical properties, microstructure and thermal stability of black chrome selective surfaces p 34 A83-15497
- [NASA-CR-169526] p 34 A83-15497
- Interaction of electromagnetic radiation and microstructural materials with regard to the production of spectral-selective solar absorbers - German thesis p 37 A83-18497
- [NASA-CR-169526] p 37 A83-18497
- Tests with concentrating collectors - construction, evaluation and qualification of parabolic solar absorbers [BMFT-FB-T-82-104] p 47 N83-10626
- [BMFT-FB-T-82-104] p 47 N83-10626

- Sol-gel protective coatings for black chrome solar selective films [DE82-004138] p 74 N83-15942
- [DE82-004138] p 74 N83-15942
- ### SOLAR ENERGY CONVERSION
- On the formula for the upper limit of photovoltaic solar energy conversion efficiency p 23 A83-10699
- [NASA-CR-169526] p 23 A83-10699
- Mathematical model for a noniterative optimization of each system for exploiting solar energy p 24 A83-11849
- [NASA-CR-169526] p 24 A83-11849
- Thermal storage performance calculations by closed form and finite difference solutions p 26 A83-12799
- [ASME PAPER 82-HT-52] p 26 A83-12799
- An experimental study of single medium thermocline thermal energy storage p 26 A83-12800
- [ASME PAPER 82-HT-53] p 26 A83-12800
- Global solar radiation estimation from relative sunshine hours in Italy p 26 A83-12951
- [ASME PAPER 82-HT-53] p 26 A83-12951
- Integrated solar energy system optimization p 26 A83-13477
- [ASME PAPER 82-HT-53] p 26 A83-13477
- Incident angle modifiers for flat-plate solar collectors - Analysis of measurement and calculation procedures p 27 A83-13480
- [ASME PAPER 82-HT-53] p 27 A83-13480
- The optical properties of titanium nitrides and carbides Spectral selectivity and photothermal conversion of solar energy p 33 A83-15490
- [NASA-CR-169526] p 33 A83-15490
- Large grain polycrystalline silicon from rice husk - for terrestrial solar cells p 33 A83-15492
- [NASA-CR-169526] p 33 A83-15492
- Hydrogen as a vector for central receiver solar utilities p 35 A83-16184
- [NASA-CR-169526] p 35 A83-16184
- Photovoltaic prospects in Europe p 35 A83-16184
- [NASA-CR-169526] p 35 A83-16184
- Liquid phase thermochemical energy conversion systems - An application of Diels-Alder chemistry p 118 A83-17149
- [NASA-CR-169526] p 118 A83-17149
- Heat Transfer and Fluid Mechanics Institute, Meeting, 28th, California State University, Sacramento, CA, June 28, 29, 1982, Proceedings p 37 A83-18451
- [NASA-CR-169526] p 37 A83-18451
- Solar energy storage by the reversible reaction - N2O4 yields 2NO2 - Theoretical and experimental results p 37 A83-18554
- [NASA-CR-169526] p 37 A83-18554
- Parabolic Dish Solar Thermal Power Annual Program Review, proceedings p 42 N83-10525
- [NASA-CR-169365] p 42 N83-10525
- Recent tests on the Carter small reciprocating steam engines p 43 N83-10536
- [NASA-CR-169365] p 43 N83-10536
- The French thermo-helio-electricity-KW parabolic dish program p 44 N83-10542
- [NASA-CR-169372] p 44 N83-10542
- Photovoltaic module encapsulation design and materials selection, volume 1, abridged p 45 N83-10553
- [NASA-CR-169372] p 45 N83-10553
- Solar energy conversion based on the principle of fluorescent collectors p 47 N83-10621
- [BMFT-FB-T-82-081] p 47 N83-10621
- The luminescent solar concentrator p 48 N83-10902
- [NASA-CR-169526] p 48 N83-10902
- Intermediate photovoltaic system application experiment operational performance report Volume 10 Newman Power Station, El Paso, Tex p 48 N83-11588
- [DE82-015791] p 48 N83-11588
- Prototype solar house Study of the scientific evaluation and feasibility of a research and development project [BMFT-FB-T-82-137] p 49 N83-11598
- [BMFT-FB-T-82-137] p 49 N83-11598
- Simulation of thermal aspects of residential photovoltaic systems p 51 N83-12555
- [DE82-020399] p 51 N83-12555
- The 1980 survey and evaluation of utility conservation, load management, and solar end-use projects Volume 3 Utility load management project p 10 N83-12559
- [DE82-007247] p 10 N83-12559
- Solar thermal technology report, FY 1981 Volume 1 Executive summary p 55 N83-13581
- [NASA-CR-169526] p 55 N83-13581
- Solar thermal technology report, FY 1981 Volume 2 Technical [NASA-CR-169527] p 55 N83-13582
- [NASA-CR-169527] p 55 N83-13582
- Electrochemical storage cell based on polycrystalline silicon p 56 N83-13600
- [DE82-020595] p 56 N83-13600
- Solar cogeneration p 57 N83-13604
- [DE82-019085] p 57 N83-13604
- NASA space photovoltaic research and technology programs p 64 N83-14713
- [NASA-CR-169526] p 64 N83-14713
- Solar energy conversion using surface plasmons for broadband energy transport p 69 N83-15815
- [NASA-CR-169526] p 69 N83-15815
- ### SOLAR FURNACES
- Refractory residues, condensates and chondrites from solar furnace experiments p 31 A83-15371
- [NASA-CR-169526] p 31 A83-15371
- Theoretical and experimental investigation of high temperature insulators subjected to intense visible radiation [AIAA PAPER 83-0158] p 38 A83-16562
- [AIAA PAPER 83-0158] p 38 A83-16562
- Prospects for the construction of solar furnaces for industry p 38 A83-19238
- [NASA-CR-169526] p 38 A83-19238
- ### SOLAR GENERATORS
- Performance characteristics of 350 kW photovoltaic power system for Saudi Arabian villages p 28 A83-13647
- [NASA-CR-169526] p 28 A83-13647

SOLAR HEATING

- Power conditioning in an autonomous system controlled by a microprocessor Simulation of use with a photovoltaic generator - French thesis p 30 A83-13807
- [NASA-CR-169365] p 30 A83-13807
- A study of different techniques for cooling solar cells in centralized concentrator photovoltaic power plants - French thesis p 30 A83-14109
- [NASA-CR-169365] p 30 A83-14109
- Photovoltaic systems measurements - Status and perspectives p 32 A83-15461
- [NASA-CR-169365] p 32 A83-15461
- Test results of a medium temperature solar engine p 115 A83-16000
- [NASA-CR-169365] p 115 A83-16000
- Design of electronic optimizer for solar electric drive system p 36 A83-17150
- [NASA-CR-169365] p 36 A83-17150
- Parabolic Dish Solar Thermal Power Annual Program Review, proceedings p 42 N83-10525
- [NASA-CR-169365] p 42 N83-10525
- Organic Rankine power conversion subsystem development for the small community solar thermal power system p 43 N83-10533
- [NASA-CR-169365] p 43 N83-10533
- ROSET. A solar-thermal electric-power simulation users guide p 53 N83-12567
- [DE82-021897] p 53 N83-12567
- Photovoltaic balance-of-system assessment p 57 N83-13622
- [DE82-090428] p 57 N83-13622
- The swing to concentrator arrays - solar arrays p 61 N83-14695
- [NASA-CR-169365] p 61 N83-14695
- Low Earth orbit blanket technologies for the power range of 15-60 kW p 61 N83-14696
- [NASA-CR-169365] p 61 N83-14696
- Preliminary results of Helios solar generator inflight performance evaluation p 64 N83-14716
- [NASA-CR-169365] p 64 N83-14716
- Analytic tools for the electrical design of solar generators p 66 N83-14727
- [NASA-CR-169365] p 66 N83-14727
- ### SOLAR HEATING
- Performance investigation of a long, slender heat pipe for thermal energy storage applications - for solar residential heating p 159 A83-10651
- [NASA-CR-169365] p 159 A83-10651
- High-temperature ceramic heat exchanger element for a solar thermal receiver p 26 A83-13478
- [NASA-CR-169365] p 26 A83-13478
- Collection of solar energy at specified output temperature p 28 A83-13582
- [NASA-CR-169365] p 28 A83-13582
- A method of rating solar collectors p 29 A83-13701
- [NASA-CR-169365] p 29 A83-13701
- Concerning the improvement of solar heating and cooling systems p 31 A83-15136
- [NASA-CR-169365] p 31 A83-15136
- Production of hydrogen by direct thermal decomposition of water - Preliminary investigations p 75 A83-16042
- [NASA-CR-169365] p 75 A83-16042
- Advances in energy technology; Proceedings of the Eighth Annual UMR-DNR Conference on Energy, University of Missouri-Rolla, Rolla, MO, November 4-7, 1981 p 169 A83-17115
- [NASA-CR-169365] p 169 A83-17115
- Evaluation of solar-air-heating central-receiver concepts p 48 N83-11586
- [DE82-016924] p 48 N83-11586
- Analytical and experimental analysis of procedures for testing solar domestic hot water systems p 49 N83-12287
- [PB82-184839] p 49 N83-12287
- Stevens Home, Rancho Santa Fe, California Solar-energy-system performance evaluation, Oct. 1981 - Apr. 1982 p 50 N83-12538
- [DE82-021698] p 50 N83-12538
- Kalin Home, Long Island, New York Solar-energy-system performance evaluation, Sep 1981-Mar 1982 p 50 N83-12539
- [DE82-021701] p 50 N83-12539
- EROS Data Center, Sioux Falls, South Dakota Solar-energy-system performance evaluation, Oct. 1981 - Apr. 1982 p 50 N83-12540
- [DE82-021703] p 50 N83-12540
- Harnessing the Sun for development. Actions for consideration by the international community at the UN Conference on New and Renewable Sources of Energy for promoting the use of renewable energy in developing countries p 52 N83-12558
- [DE82-020273] p 52 N83-12558
- Superior heat-transfer fluids for solar heating and cooling applications. Results of acute oral-toxicity determinations [DE82-002758] p 52 N83-12560
- [DE82-002758] p 52 N83-12560
- Solar-energy-system performance evaluation, Cathedral Square, Burlington, Vermont, July - December 1981 [DE82-016999] p 52 N83-12563
- [DE82-016999] p 52 N83-12563
- Williamson Home, Ipswich, Mass. solar-energy-system performance evaluation, Nov 1981 - Apr. 1982 p 53 N83-12574
- [DE82-021300] p 53 N83-12574
- Lo-Cal, Champaign, Illinois solar-energy-system performance evaluation, Jan. 1982 - Apr. 1982 p 53 N83-12575
- [DE82-021299] p 53 N83-12575
- Isakson Home, Anoka, Minnesota solar-energy-system performance evaluation, Aug. 1981 - Mar. 1982 p 54 N83-12576
- [DE82-021297] p 54 N83-12576
- Karasek Home, Blackstone, Massachusetts solar-energy-system performance evaluation, Nov 1981 - Mar. 1982 p 54 N83-12577
- [DE82-021302] p 54 N83-12577
- Wood Road School, Ballston Spa, New York solar-energy-system performance evaluation, November 1981 - April 1982 p 54 N83-12586
- [DE82-021301] p 54 N83-12586

- Comparative analysis of economic models in selected solar energy computer programs p 55 N83-12589
[PB82-184995]
- An overview of Solar Industrial Process-Heat (SIPH) applications below 120 deg C p 57 N83-13603
[DE82-021360]
- Solar cogeneration p 57 N83-13604
[DE82-019085]
- Acceptance-test report for El Toro Library solar heating and cooling demonstration project (SHAC no. 1501) p 57 N83-13616
[DE82-019859]
- Overview of passive solar design techniques p 73 N83-15899
[AD-A119993]
- Simplified solar fraction estimation for space and water heating at Department of Defense installations Appendix C Water heating nomographs p 73 N83-15904
[AD-A120014]
- Simplified solar fraction estimation for space and water heating at Department of Defense installations Appendix B Space heating nomographs p 73 N83-15905
[AD-A120013]
- Simplified solar fraction estimation for space and water heating at Department of Defense installations p 74 N83-15906
[AD-A120012]
- Use of oxide decompositions in advanced thermochemical hydrogen cycles for solar heat sources Experimental results on the low-temperature reactions for the trisulfate-tetraoxide-cobalt monoxide pair p 77 N83-15958
[DE82-002390]
- SOLAR HOUSES**
- Analysis of thermal comfort in a passive solar heated residence p 39 N83-10297
[PB82-180142]
- J. F. Long experimental photovoltaic house p 50 N83-12547
[DE82-020506]
- Passive solar energy in Washington Results of the Washington passive solar design/build/competition p 51 N83-12549
[DE82-020394]
- Data report for the Northeast Residential Experiment Station, May 1982 p 51 N83-12553
[DE82-020398]
- Design and fabrication of a prototype system for photovoltaic residences in the Southwest p 51 N83-12554
[DE82-020783]
- Data report for the Southwest Residential Experiment Station, Mar 1982 p 52 N83-12556
[DE82-020400]
- Solar home show Homes designed for the solar homebuilders program p 52 N83-12557
[DE82-020255]
- Study of photovoltaic residential retrofits Volume 2 Main report p 53 N83-12566
[DE82-015626]
- Data report for the Northeast Residential Experiment Station, Apr 1982 p 53 N83-12569
[DE82-021954]
- Williamson Home, Ipswich, Mass solar-energy-system performance evaluation, Nov 1981 - Apr 1982 p 53 N83-12574
[DE82-021300]
- Isakson Home, Anoka, Minnesota solar-energy-system performance evaluation, Aug 1981 - Mar 1982 p 54 N83-12576
[DE82-021297]
- Karasek Home, Blackstone, Massachusetts solar-energy-system performance evaluation, Nov 1981 - Mar 1982 p 54 N83-12577
[DE82-021302]
- SOLAR INSTRUMENTS**
- Spectroradiometer measurements in support of photovoltaic device testing p 32 A83-15458
- SOLAR PONDS (HEAT STORAGE)**
- A computer simulation model of salt-gradient solar ponds p 55 N83-13580
- SOLAR POWER SATELLITES**
- Solar satellites p 22 A83-10428
- Current topics of SPS realization from a European viewpoint p 156 A83-11283
- Loss currents of solar cells under Low Earth Orbit (LEO) conditions p 65 N83-14721
- Outlook for space energy systems at the end of the three-year assessment p 18 N83-14734
- Direct conversion of infrared radiant energy for space power applications p 73 N83-15865
- Interaction between the SPS solar power satellite solar array and the magnetospheric plasma p 73 N83-15868
- SOLAR RADIATION**
- Global solar radiation estimation from relative sunshine hours in Italy p 26 A83-12951
- Determination of climatological parameters of global radiation and direct solar radiation for horizontal, not horizontal, fixed and normal incident radiation absorber [BMFT-FB-T-82-070] p 48 N83-10718
- Evaluation of solar-air-heating central-receiver concepts p 48 N83-11586
[DE82-016924]
- Solar availability in cities and towns A computer model p 49 N83-11608
[PB82-202201]
- Solar cell radiation handbook p 61 N83-14687
[NASA-CR-169662]
- Determination of the radiation budget at the Earth's surface from satellite data p 68 N83-14808
- Overview of passive solar design techniques p 73 N83-15899
[AD-A119993]
- SOLAR REFLECTORS**
- Effect of off-south orientation on the performance of collector reflector system in India p 30 A83-14671
- Modifications and testing of a 4-95 Stirling engine for solar applications p 44 N83-10538
- Dish Stirling system integration and test progress report p 44 N83-10539
- Commercialization of parabolic dish systems p 44 N83-10540
- A point focusing collector for an integrated water/power complex p 44 N83-10541
- The French thermo-helio-electricity-KW parabolic dish program p 44 N83-10542
- Structural design considerations for a line-focus reflective module using inexpensive composite materials [DE82-021611] p 54 N83-12587
- SOLAR SIMULATORS**
- Rapid simulated solar absorptance measurements on flat or curved surfaces p 32 A83-15476
- SOLAR THERMAL ELECTRIC POWER PLANTS**
- Solar thermal electricity generation - EURELIOS, the 1 MW/ell helioelectric power plant of the European communities p 24 A83-11802
- Thermal energy storage units for solar electric power plants p 31 A83-15132
- Test results of a medium temperature solar engine p 115 A83-16000
- An experimental investigation of convective losses from solar receivers p 39 N83-10500
[UIU-ENG-81-4003]
- The small community solar thermal power experiment p 43 N83-10531
- Development status of the small community solar power system p 43 N83-10532
- Organic Rankine power conversion subsystem development for the small community solar thermal power system p 43 N83-10533
- SOLAR TOTAL ENERGY SYSTEMS**
- A 400-kWe high-efficiency steam turbine for industrial cogeneration p 43 N83-10537
- SOLDERED JOINTS**
- Soldered solar arrays p 67 N83-14735
- SOLDERING**
- The course of solar array welding technology development p 72 N83-15831
- Microstructural analysis of solar cell welds p 72 N83-15833
- Blanket technology p 72 N83-15838
- SOLID ELECTRODES**
- Polymetric metallic electrodes for rechargeable battery applications p 160 A83-11813
- Zinc electrode morphology in alkaline solutions I - Study of alternating voltage modulation on a rotating disk electrode p 115 A83-15867
- Emission characteristics of refractory materials - as electrodes in aerodynamic generators p 116 A83-16019
- SOLID PROPELLANT IGNITION**
- Volatile production during preignition heating [DE82-003061] p 109 N83-15402
- SOLID STATE PHYSICS**
- Solar cell device physics - Book p 27 A83-13501
- SOLID WASTES**
- An oxygen flow calorimeter for determining the heating value of kilogram size samples of municipal solid waste p 87 N83-10580
- An economic and engineering analysis of the full-scale trommel screen operations at Baltimore County, Maryland p 87 N83-10581
- Solid waste to methane gas (RefCOM) p 88 N83-10584
- Urban waste as a potential source for brick plants p 88 N83-10591
- Development of a solid waste fired fluidized boiler, phase 1 p 88 N83-10592
- Conversion of municipal solid waste to energy, Jacksonville, Florida p 5 N83-10593
- Demonstration of landfill gas enhancement techniques in landfill simulators p 88 N83-10594
- Research, development and demonstration in the design of sanitary landfill to optimize the generation and capture of compressible gas p 89 N83-10595
- Landfill gas recovery: An analysis of results p 89 N83-10596
- Performance analysis of cofiring densified refuse derived fuel in a military boiler p 93 N83-11583
[AD-A118022]
- Demonstration of synergistic industrial energy/municipal solid waste disposal facility p 99 N83-13041
[DE82-001145]
- Components identified in energy-related wastes and effluents p 101 N83-13283
[PB82-236985]
- Analysis of treated sludges and associated leachates from coal-conversion facilities p 103 N83-13650
[DE82-001488]
- Energy resource recovery facility for Kent and Sussex counties, Delaware p 19 N83-14753
[DE82-002539]
- Cleaning up the environment. Progress achieved but major unresolved issues remain p 19 N83-14767
[GAO/CED-82-72]
- Boiler efficiency and emissions testing using Refuse-Derived Fuel (RDF) and coal p 19 N83-14772
[AD-A119291]
- SOLID-SOLID INTERFACES**
- The influence of the interface state on the properties of solar cell semiconductor electrodes p 26 A83-13473
- SOLIDIFICATION**
- Synroc processing options - processing nuclear reactor wastes using a titanate based ceramic p 17 N83-13976
[DE82-004230]
- SOLIDS**
- Thermodynamic data for desulfurization processes [PB82-184904] p 95 N83-12207
- SOLUTES**
- Coal gasification of steam-soluted catalyst [BMFT-FB-T-82-073] p 81 N83-10143
- SOLUTION**
- Catalytic liquefaction of biomass p 108 N83-14752
[DE82-003329]
- SOLVENT REFINED COAL**
- Literature survey of properties of synfuels derived from coal [NASA-TM-82739] p 83 N83-10208
- SOLVENTS**
- Compilation of air pollutant emission factors, supplement 12 p 6 N83-10654
[PB82-184722]
- Effects of solvent composition and concentration on early liquefaction reactions p 109 N83-15395
[DE82-004136]
- SOOT**
- Soot formation in synfuels p 94 N83-12199
[DE82-004271]
- Fumigation of alcohol in a light duty automotive diesel engine p 100 N83-13272
[NASA-CR-167915]
- SOUND PRESSURE**
- Analysis of combustion spectra containing organ pipe tone by cepstral techniques [NASA-TM-83034] p 77 N83-16153
- SOUND PROPAGATION**
- Analysis of combustion spectra containing organ pipe tone by cepstral techniques [NASA-TM-83034] p 77 N83-16153
- SOURCES**
- Break-in, performance and endurance tests results on fixed displacement hydraulic fluid power vane pumps [AD-A117962] p 128 N83-11504
- SPACE**
- Some material implications of space nuclear reactors (non-fuel materials) p 170 N83-15870
- Nuclear fuel systems for space power application p 144 N83-15871
- SPACE CHARGE**
- The residual voltage in fast electrophotography of a-SiH_x/x p 34 A83-15511
- Applications of materials surface modification to prime power systems p 144 N83-15878
- SPACE COOLING (BUILDINGS)**
- The prediction of the thermal performance of building by the CR-method - heat storage and transmission [CSIR-BRR-396] p 161 N83-11578
- Northern-climate heat-pump field performance evaluation p 12 N83-13402
[DE82-905832]
- TI-59 program for calculating the annual energy requirements for residential heating and cooling Volume 1 Users manual p 13 N83-13594
[DE82-010174]
- TI-59 program for calculating the annual energy requirements for residential heating and cooling Volume 2 Program reference manual p 13 N83-13595
[DE82-020275]
- Development of the trickle roof cooling and heating system Experimental plan p 57 N83-13615
[DE82-019082]
- Controlling energy consumption in single buildings [AD-A118898] p 19 N83-14739

SUBJECT INDEX

Performance of labyrinth-stratified water-storage system for heating and cooling [DE82-000107] p 168 N83-15946

SPACE ENVIRONMENT SIMULATION

Environmentally induced discharges in a solar array p 38 N83-17493

Thin cell development and testing — solar cells p 62 N83-14702

A family of thin high efficiency silicon solar cells p 62 N83-14703

Development and testing of a spacecraft surface potential monitor p 65 N83-14718

Soldered solar arrays p 67 N83-14735

SPACE ERECTABLE STRUCTURES

Materials technology for large space structures p 171 N83-15882

SPACE FLIGHT

Cryo-cooler development for space flight applications p 114 N83-13460

Simulated space flight testing of commercial terrestrial silicon cells p 69 N83-15811

SPACE HEATING (BUILDINGS)

Performance investigation of a long, slender heat pipe for thermal energy storage applications — for solar residential heating p 159 N83-10651

NECAP 4.1 NASA's Energy Cost Analysis Program thermal response factor routine [NASA-CR-165982] p 4 N83-10562

NECAP 4.1 NASA's Energy-Cost Analysis Program fast input manual and example [NASA-TM-83241] p 4 N83-10566

WECS-load controlled pitch-variable load conversion to heat [DE82-014683] p 121 N83-10602

Feasibility study of geothermal heating, Modoc Lassen housing project [DE82-015099] p 89 N83-10611

Geothermal community heating for Cape Charles, Virginia [PB82-184003] p 91 N83-10640

The prediction of the thermal performance of building by the CR-method — heat storage and transmission [CSIR-BRR-396] p 161 N83-11578

Basin view geothermal heating district, Klamath Falls, Oregon Conceptual design and economic-feasibility study report [DE82-015108] p 93 N83-11587

Thermochemical heat storage State-of-the-art report [PB82-188087] p 162 N83-11610

Williamson Home, Ipswich, Mass solar-energy-system performance evaluation, Nov 1981 - Apr 1982 [DE82-021300] p 53 N83-12574

Lo-Cal, Champaign, Illinois solar-energy-system performance evaluation, Jan 1982 - Apr 1982 [DE82-021299] p 53 N83-12575

Isakson Home, Anoka, Minnesota solar-energy-system performance evaluation, Aug 1981 - Mar 1982 [DE82-021297] p 54 N83-12576

Karasek Home, Blackstone, Massachusetts solar-energy-system performance evaluation, Nov 1981 - Mar 1982 [DE82-021302] p 54 N83-12577

Telluride School, Telluride, Colorado solar-energy-system performance evaluation, February 1982 - April 1982 p 54 N83-12585

Northern-climate heat-pump field performance evaluation [DE82-905832] p 12 N83-13402

TI-59 program for calculating the annual energy requirements for residential heating and cooling Volume 1 Users manual [DE82-010174] p 13 N83-13594

TI-59 program for calculating the annual energy requirements for residential heating and cooling Volume 2 Program reference manual [DE82-020275] p 13 N83-13595

Guide to a geothermal heat plan. A geothermal energy application, serial no 3 [DE82-020591] p 13 N83-13599

Optimal sizing of heating systems that store and use thermal energy [DE82-003011] p 164 N83-13609

Controlling energy consumption in single buildings [AD-A118898] p 19 N83-14739

Simplified solar fraction estimation for space and water heating at Department of Defense installations. Appendix B Space heating nomographs [AD-A120013] p 73 N83-15905

Simplified solar fraction estimation for space and water heating at Department of Defense installations [AD-A120012] p 74 N83-15906

The USDA agricultural wind energy research program p 147 N83-15914

Performance of labyrinth-stratified water-storage system for heating and cooling [DE82-000107] p 168 N83-15946

Field evaluation and assessment of thermal energy storage for residential space heating [DE82-000184] p 168 N83-15949

SPACE MISSIONS

Alkaline fuel cells for prime power and energy storage p 167 N83-15845

SPACE PLASMAS

Interaction between the SPS solar power satellite solar array and the magnetospheric plasma p 73 N83-15868

SPACE PLATFORMS

Large area space solar cell assemblies p 68 N83-15810

Prime power for high-energy space systems Certain research issues p 143 N83-15863

SPACE SHUTTLE ORBITERS

Microprocessor control of power sharing and solar array peak power tracking for high power /2.5 kW/ switching power converters p 23 N83-11007

SPACE SHUTTLE PAYLOADS

NASA solar array flight experiment p 65 N83-14722

SPACE STATIONS

Power requirements for manned space stations p 140 N83-15842

SPACEBORNE ASTRONOMY

Cryo-cooler development for space flight applications p 114 N83-13460

SPACECRAFT CHARGING

Development and testing of a spacecraft surface potential monitor p 65 N83-14718

Interaction between the SPS solar power satellite solar array and the magnetospheric plasma p 73 N83-15868

SPACECRAFT CONSTRUCTION MATERIALS

Overview of high-temperature materials for high-energy space power systems p 144 N83-15869

Materials technology for large space structures p 171 N83-15882

SPACECRAFT CONTAMINATION

General contamination criteria for optical surfaces — instrument performance losses in spaceborne conditions p 29 N83-13743

SPACECRAFT LAUNCHING

Case for a Space Center in the Arabian Gulf p 2 N83-18812

SPACECRAFT MANEUVERS

Proceedings of the AFOSR Special Conference on Prime-Power for High Energy Space Systems, volume 1 [AD-A118887] p 140 N83-15841

SPACECRAFT POWER SUPPLIES

Microprocessor control of power sharing and solar array peak power tracking for high power /2.5 kW/ switching power converters p 23 N83-11007

Nuclear energy in space p 113 N83-11837

QAO-3 end of mission power subsystem evaluation [NASA-TM-83959] p 161 N83-11580

Secondary battery requirements for space use in the late 1980's 1990's [HL82/1200] p 165 N83-13627

Research needs Prime-power for high energy space systems [AD-A119243] p 135 N83-14156

Photovoltaic Generators in Space — conference [ESA-SP-173] p 61 N83-14694

Advanced rigid array — satellite solar arrays p 62 N83-14697

Module technique of 5 x 5 cm(2) solar cells — for spacecraft p 62 N83-14698

Ultralightweight solar array technology — spacecraft power p 66 N83-14729

The design of the L-SAT solar array p 66 N83-14730

Simulated space flight testing of commercial terrestrial silicon cells p 69 N83-15811

Proceedings of the AFOSR Special Conference on Prime-Power for High Energy Space Systems, volume 1 [AD-A118887] p 140 N83-15841

Power requirements for manned space stations p 140 N83-15842

Chemical sources Battery p 140 N83-15844

MHD power: Overview p 140 N83-15846

Liquid-metal MHD for space power systems p 141 N83-15850

Magnetohydrodynamic power supply systems for space applications p 141 N83-15852

Potential role and technology status of closed-cycle MHD for light-weight nuclear space-power systems p 142 N83-15853

MHD generator research at Stanford p 142 N83-15854

Overview of space reactors p 142 N83-15855

Technological boundary conditions for nuclear electric space power plants p 142 N83-15856

Effects of reactor design, component characteristics and operating temperatures on direct conversion power systems p 142 N83-15857

SPECTROSCOPIC ANALYSIS

Gas cooled reactors for large space power needs— p 142 N83-15858

Compact, high-power nuclear reactor systems based on small diameter particulate fuel p 143 N83-15859

Proceedings of the AFOSR Special Conference on Prime-Power for High Energy Space Systems, volume 2 [AD-A118888] p 143 N83-15860

A proposed optical pumping system requiring no electric power p 143 N83-15861

Status of thermoelectronic laser energy conversion, TELEC p 143 N83-15864

Direct conversion of infrared radiant energy for space power applications p 73 N83-15865

Radiation-driven MHD systems for space applications p 144 N83-15867

Overview of high-temperature materials for high-energy space power systems p 144 N83-15869

Materials for high power MHD systems p 144 N83-15872

Growth of diamondlike films for power applications p 170 N83-15880

Ceramics for high power sources in space p 171 N83-15881

Structural characterization of materials for high energy space systems p 171 N83-15883

Thermionic conversion for space power application p 144 N83-15886

Thermionic technology for spacecraft power Progress and problems p 145 N83-15887

A survey of recent advances in and future prospects for thermionic energy conversion p 145 N83-15888

Thermal management of large pulsed power systems p 145 N83-15889

The need for improved heat pipe fluids p 159 N83-15892

Two-phase heat transport for thermal control p 159 N83-15894

Liquid ribbon radiator for lightweight space radiator systems p 145 N83-15895

Power conversion Overview p 145 N83-15898

SPACECRAFT PROPULSION

Advances in series resonant inverter technology and its effect on spacecraft employing electric propulsion [AIAA PAPER 82-1881] p 114 N83-12466

Proceedings of the AFOSR Special Conference on Prime-Power for High Energy Space Systems, volume 2 [AD-A118888] p 143 N83-15860

Radiation-driven MHD systems for space applications p 144 N83-15867

SPACECRAFT RADIATORS

Advances in series resonant inverter technology and its effect on spacecraft employing electric propulsion [AIAA PAPER 82-1881] p 114 N83-12466

The need for improved heat pipe fluids p 159 N83-15892

Enhanced heat pipe theory and operation p 145 N83-15893

SPACECRAFT REENTRY

Prime power for high-energy space systems Certain research issues p 143 N83-15863

SPACECRAFT STRUCTURES

Interaction between the SPS solar power satellite solar array and the magnetospheric plasma p 73 N83-15868

SPARK IGNITION

Status of alcohol-fuels-utilization technology for highway transportation A 1981 perspective Volume 1 Spark-ignition engines [DE82-020493] p 96 N83-12255

SPECIFIC HEAT

The heat capacity of coal chars p 83 N83-10206

SPECIFICATIONS

An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil Part 4 Production of samples of military fuels from raw shale oils [AD-A117526] p 83 N83-10211

SPECTRAL REFLECTANCE

A survey of spectral response measurements for photovoltaic devices [DE82-006221] p 50 N83-12545

SPECTRAL SENSITIVITY

Determination of the integral currents of solar cells using an improved method of spectral sensitivity measurement p 23 N83-11696

Calibration of solar cells by the reference cell method - The spectral mismatch problem p 28 N83-13580

Spectral selectivity of high-temperature solar absorbers. II Effects of interference p 33 N83-15488

SPECTRORADIOMETERS

Spectroradiometer measurements in support of photovoltaic device testing p 32 N83-15458

SPECTROSCOPIC ANALYSIS

Defect behavior in electron-irradiated boron- and gallium-doped silicon p 70 N83-15823

SPECTRUM ANALYSIS

SPECTRUM ANALYSIS

- Spectroscopic studies of the hazards of Li/SOC12 batteries during anode-limited cell reversal
p 114 A83-12056
- Soft X-ray diagnostics on Tokamak TM-1-MH
p 151 N83-16121

SPEED CONTROL

- Performance of the Wells turbine at starting
p 113 A83-10661

SPENT FUELS

- Catalytic liquefaction of biomass
[DE82-003329] p 108 N83-14752

SPHERES

- Axisymmetric reflectors of the stepped spherical type
p 38 A83-19194

SPHERICAL COORDINATES

- Curvilinear coordinates for magnetic confinement geometries
[DE82-019733] p 124 N83-10928

SPILLING

- Investigation of engineering and design considerations in selecting conveyors for densified Refuse-Derived Fuel (rDF) and rRDF Coal mixtures
[AD-A119065] p 107 N83-14495

SPRINGS (WATER)

- Radar and infrared remote sensing of geothermal features at Pilgrimage Springs, Alaska
p 79 A83-12036

SPUTTERING

- Review of plasma-impurity sources during Tokamak operation
[DE82-017098] p 126 N83-10951

STABILITY

- Production and experimental study of the dissipative trapped ion instability
p 123 N83-10910
- Rippling modes in the edge of a Tokamak plasma
[DE82-007724] p 125 N83-10940
- Sufficient stability condition for alpha-driven velocity-space modes in compression Tokamak
[IPPJ-609] p 131 N83-12996
- Beam and deposition stability in light-ion fusion targets
[DE82-017768] p 134 N83-13993

STACKS

- Cell module and fuel conditioner development
[NASA-CR-165462-A] p 130 N83-12524

STANDARDS

- Photovoltaic systems measurements - Status and perspectives
p 32 A83-15461

STARTING

- Performance of the Wells turbine at starting
p 113 A83-10661
- Startup conditions of alkali-metal vaporization from rectangular channels --- in heat pipes
p 157 A83-18446

STATIC AERODYNAMIC CHARACTERISTICS

- Static and dynamic analysis for hinged rotor blades of 60 m span for a two bladed horizontal axis wind energy converter
p 130 N83-12535

STATIC INVERTERS

- Power conditioning unit development for MAG-TRANSIT
p 113 A83-11021

STATISTICAL ANALYSIS

- Generalized characteristics and applicability of various probability distributions for wind energy applications
p 112 A83-10654

- Standardization of sampling and analysis of geopressed fluids Part 2 Monitoring of geopressed wells
p 82 N83-10151

- US-Japan Joint Institute for Fusion Theory Workshop on Nonequilibrium Statistical Physics Problems in Fusion Plasmas Stochasticity and Chaos
[IPPJ-587] p 123 N83-10920

- Evaluation of short-term NO2 plume models for point sources Volume 1 Technical discussion
[PB82-234329] p 16 N83-13658

STATISTICS

- Hydrogeochemical and stream-sediment reconnaissance basic data for Utica quadrangle, New York Uranium Resource Evaluation Project
[DE82-020429] p 102 N83-13552

- Hydrogeochemical and stream-sediment reconnaissance basic data for Jenkins Quadrangle, Kentucky, Virginia, West Virginia Uranium resource evaluation project
[DE82-020431] p 102 N83-13558

STEADY FLOW

- Wind turbine blades: A study of prototypes in a steady regime - Unsteady considerations
[AAAF PAPER NT 81-17] p 113 A83-11777

STEAM

- Hard coal gasification using catalysts dissolved in steam
[BMFT-FB-T-82-107] p 82 N83-10146
- Kinetics and catalysis of producing synthetic gases from biomass
[PB82-214347] p 82 N83-10156

- Positive displacement rotary vapor compressor for vapor compression --- for waste steam utilization
[PB82-227620] p 3 N83-10429

- Recent tests on the Carter small reciprocating steam engines
p 43 N83-10536
- Small-scale waste-to-energy systems A state-of-the-art report
p 4 N83-10583

- Utilization of the waste heat of a steel work
[BMFT-FB-T-82-135] p 8 N83-11597

- Catalytic combustion with steam injection
[NASA-TM-82923] p 111 N83-15805

STEAM TURBINES

- A 400-kWe high-efficiency steam turbine for industrial cogeneration
p 43 N83-10537

STELLAR MODELS

- Diagnostics of nonequilibrium hydrogen plasma
p 153 N83-16135

STELLARATORS

- US-Japan Joint Institute for Fusion Theory Workshop on Equilibrium, Stability and Transport of Nonaxisymmetric Systems
[IPPJ-577] p 124 N83-10922
- Conceptual design for a modular-stellarator fusion-reactor magnet
[DE82-002863] p 138 N83-15135
- Physics (selected articles)
[AD-A119830] p 154 N83-16143

STIRLING CYCLE

- Modifications and testing of a 4-95 Stirling engine for solar applications
p 44 N83-10538
- Dish Stirling system integration and test progress report
p 44 N83-10539
- Conceptual design and cost analysis of hydraulic output unit for 15 kW free-piston Stirling engine
[NASA-CR-165543] p 121 N83-10561

- A conceptual study of the potential for automotive-derived and free-piston Stirling engines in 30- to 400-kilowatt stationary power applications
[NASA-CR-165274] p 121 N83-10568

- Automotive Stirling Engine Mod 1 Design Review, volume 2
[NASA-CR-167936] p 127 N83-10991

- Vehicle characterization for the TAPCUT Project Performance and cost
[DE82-019772] p 13 N83-13465

- Automotive Stirling engine development program
[NASA-CR-167907-2] p 140 N83-15176

- Automotive Stirling engine development program
[NASA-CR-167907-1] p 140 N83-15177

- Power conversion Overview
p 145 N83-15898

STOICHIOMETRY

- Development of criteria for extension of applicability of low-emission, high-efficiency coal burners
[PB82-187153] p 93 N83-11377

STORAGE BATTERIES

- Polymers metallic electrodes for rechargeable battery applications
p 160 A83-11813

- Transport properties of Nafion membranes for use in three-electrode photoelectrochemical storage cells
p 160 A83-12055

- Thermal energy storage units for solar electric power plants
p 31 A83-15132

- Secondary battery requirements for space use in the late 1980's 1990's
[HL82/1200] p 165 N83-13627

- Assessment of research needs for advanced battery systems
[PB82-227349] p 165 N83-13634

STORAGE TANKS

- Welding of AL-MG alloy 5083-0 for the construction of LNG storage tanks
p 93 N83-11500

- Thermal analysis of the position of the freezing front around an LNG in-ground storage tank with a heat barrier
p 110 N83-15712

- Performance of labyrinth-stratified water-storage system for heating and cooling
[DE82-000107] p 168 N83-15946

STRATIFICATION

- Interaction in limited arrays of windmills
[DE82-750056] p 133 N83-13608

STRATIGRAPHY

- Preliminary plan for the development of geothermal energy in the town of Gabbs, Nevada
[DE82-904441] p 15 N83-13621

STREAMS

- Hydrogeochemical and stream-sediment reconnaissance basic data for Utica quadrangle, New York Uranium Resource Evaluation Project
[DE82-020429] p 102 N83-13552

- Hydrogeochemical and stream-sediment reconnaissance basic data for Beaumont, Lake Charles and Baton Rouge quadrangles, Texas, Louisiana. Uranium Resource Evaluation Project
[DE82-020438] p 102 N83-13554

- Effects of oil on tundra ponds and streams
[DE82-018899] p 15 N83-13649

STRESS ANALYSIS

- Investigation of reliability attributes and accelerated stress factors on terrestrial solar cells
[NASA-CR-169620] p 59 N83-14670

STRESS CONCENTRATION

- Contact stresses on a thin plate after large displacements to a full parabolic surface
[DE82-005712] p 55 N83-13504

STRESS CORROSION CRACKING

- Stress-corrosion studies in coal-liquefaction environments
[DE82-001464] p 100 N83-13240

STRESS PROPAGATION

- Stress studies in EPG
[NASA-CR-169640] p 60 N83-14677

STRONTIUM TITANATES

- Oxygen evolution improvement at a Cr-doped SrTiO3 photocanode by a Ru-oxide coating
p 33 A83-15493

STRUCTURAL ANALYSIS

- Structural-dynamic-response characteristics of Darnes vertical axis wind turbines
[DE82-003583] p 135 N83-14545

- Gust structure analysis for WECS Design and performance analysis
[DE82-005321] p 137 N83-14746

- Power from the hot-dry-rock geothermal resource
[DE82-000759] p 107 N83-14750

- Structural characterization of materials for high energy space systems
p 171 N83-15883

STRUCTURAL DESIGN

- High-temperature ceramic heat exchanger element for a solar thermal receiver
p 26 A83-13476

- CAEDS Computer-aided engineering and architectural design system
[AD-A117972] p 170 N83-11794

- Passive solar energy in Washington Results of the Washington passive solar design/build/competition
[DE82-020394] p 51 N83-12549

- Design and fabrication of a prototype system for photovoltaic residences in the Southwest
[DE82-020783] p 51 N83-12554

- Solar home show Homes designed for the solar homebuilders program
[DE82-020255] p 52 N83-12557

- Structural design considerations for a line-focus reflective module using inexpensive composite materials
[DE82-021611] p 54 N83-12587

- The MFTF-B plasma diagnostic system
[DE82-002594] p 155 N83-16228

STRUCTURAL DESIGN CRITERIA

- A review of aero-generator fatigue problems
p 119 A83-18939

- Design and fabrication of composite blades for the Mod-1 wind turbine generator
[NASA-CR-167987] p 128 N83-11579

STRUCTURAL ENGINEERING

- CAEDS Computer-aided engineering and architectural design system
[AD-A117972] p 170 N83-11794

- Research and technology, Lewis Research Center
[NASA-TM-83038] p 167 N83-15169

STRUCTURAL PROPERTIES (GEOLOGY)

- Geological studies of the COST numbers G-1 and G-2 wells, United States north Atlantic outer continental shelf
[USGS-CIRC-861] p 94 N83-11638

- Hydrogeochemical and stream-sediment reconnaissance basic data for Jenkins Quadrangle, Kentucky, Virginia, West Virginia Uranium resource evaluation project
[DE82-020431] p 102 N83-13558

- Hydrogeochemical and stream-sediment reconnaissance basic data for Sherman, Taxarkana, El Dorado, and Greenwood quadrangles, Oklahoma, Texas, Arkansas; Mississippi
[DE82-020438] p 102 N83-13559

STRUCTURAL RELIABILITY

- Forced vibration analysis of rotating structures with application to vertical axis wind turbines
[DE82-000620] p 133 N83-13625

SUBSTITUTES

- Assessment of current and projected future trends in light-duty-vehicle fuel switching Subtask 1
[DE82-018816] p 97 N83-12440

SUBSTRATES

- Method for depositing an oxide coating
[NASA-CASE-LEW-13131-1] p 39 N83-10494

SUGARS

- Technical and economic assessment of processes for the production of butanol and acetone
[NASA-CR-169623] p 106 N83-14293

SULFIDES

- Electrochemical determination of Gibbs energies of formation of cobalt and nickel sulfides
[PB82-177304] p 119 N83-10159

SUBJECT INDEX

SULFONATES

Studies leading to the development of high-rate lithium sulfuryl chloride battery technology [AD-A120002] p 146 N83-15907

SULFUR

Development of the sodium/sulfur batteries, phase 2 [BMFT-FB-T-82-142] p 162 N83-11599

SULFUR COMPOUNDS

Fossil-energy [DE82-018269] p 86 N83-10570
Ashing properties of coal blends p 86 N83-10572
Development of instrumental methods of analysis of sulfur compounds in coal process streams [DE82-003253] p 108 N83-14775
Development of instrumental methods of analysis of sulfur compounds in coal-process streams [DE82-003291] p 20 N83-14776
Studies leading to the development of high-rate lithium-sulfuryl chloride battery technology [AD-A120853] p 146 N83-15901

SULFUR DIOXIDES

Mechanisms of dry SO₂ control processes [PB82-196924] p 12 N83-12668

SULFUR OXIDES

Lithium-sulfur dioxide (Li/SO₂) battery safety hazards Thermal studies [AD-A119381] p 163 N83-13591

SUNLIGHT

Solar availability in cities and towns A computer model [PB82-202201] p 49 N83-11608
Determination of optimum sunlight concentration level in space for 3-5 cascade solar cells p 66 N83-14732
Determination of optimum sunlight concentration level in space for 3-5 cascade solar cells p 69 N83-15814

SUPERCONDUCTING MAGNETS

Stability and disturbance of large dc superconducting magnets [DE82-012388] p 122 N83-10879
Magnetoelastic instabilities and vibrations of superconducting-magnet systems [DE82-015206] p 123 N83-10880
Design and testing of a 13.75 MW converter for a superconducting magnetic-energy-storage system [DE82-002385] p 166 N83-14749
Assessment of some of the problems in the USA of superconducting magnets for fusion research [DE82-003066] p 137 N83-15111

SUPERCONDUCTING POWER TRANSMISSION

Superconducting-transmission-line project at the Los Alamos National Laboratory [DE82-021835] p 158 N83-12344

SUPERCONDUCTIVITY

The 30-MJ superconducting magnetic energy storage for BPA transmission-line stabilizer [DE82-002355] p 165 N83-14414

SUPERCONDUCTORS

Refrigeration system of superconducting generators for large power plants [BMFT-FB-T-82-071] p 120 N83-10369
Superconducting-transmission-line project at the Los Alamos National Laboratory [DE82-021835] p 158 N83-12344
Assessment of some of the problems in the USA of superconducting magnets for fusion research [DE82-003066] p 137 N83-15111
Magnet and conductor developments for the mirror fusion program [DE82-001062] p 139 N83-15136

SUPERCOOLING

Utilizing subcooled, superfluid He-II in the design of a 12-Tesla tandem-mirror experiment [DE82-003322] p 138 N83-15133

SUPERPLASTICITY

On the properties of the superplastic aluminium-calcium alloy as material for solar collectors p 34 A83-15496

SUPERSONIC COMBUSTION RAMJET ENGINES

Radiant heating tests of several liquid metal heat-pipe sandwich panels [AIAA PAPER 83-0319] p 157 A83-16649
Fabrication and development of several heat pipe honeycomb sandwich panel concepts — airframe integrated scramjet engine [NASA-CR-165962] p 170 N83-10379

SURFACE FINISHING

Textured solar cell covers for light weight and high performance p 66 N83-14728

SURFACE GEOMETRY

Rapid simulated solar absorptance measurements on flat or curved surfaces p 32 A83-15476

SURFACE PROPERTIES

LNG plume interaction with surface obstacles [PB82-198995] p 12 N83-12666
Applications of materials surface modification to prime power systems p 144 N83-15878

SURFACE REACTIONS

General contamination criteria for optical surfaces — instrument performance losses in spaceborne conditions p 29 A83-13743

SURFACE TEMPERATURE

Data collection and analysis for geothermal research [PB82-185430] p 97 N83-12390

SURFACE WATER

Ice distribution and winter surface circulation patterns, Kachemak Bay, Alaska p 1 A83-12038

SURFACTANTS

Critical relationships for displacement processes in oil fields [BMFT-FB-T-82-093] p 84 N83-10479

SURVEYS

The 1980 survey and evaluation of utility conservation, load management, and solar end-use projects Volume 3 Utility load management project [DE82-007247] p 10 N83-12559

SWITCHES

Heat pipe thermal switch [NASA-CASE-GSC-12812-1] p 159 N83-12525

SWITCHING CIRCUITS

Microprocessor control of power sharing and solar array peak power tracking for high power /2.5 kW/ switching power converters p 23 A83-11007
Equidensitometrical evaluation of a film record of an SF₆ switching arc p 153 N83-16136

SYNTHESIS (CHEMISTRY)

Experiments on the ADAM 1 plant for the optimisation of methanization process in the long distance nuclear energy transmission system test run performed in the spring of 1980 [BLL-T5869/BG/MRS14614/82] p 85 N83-10495
Union Carbide Corp polysilicon status and plans p 40 N83-10508

Phase equilibrium studies for methane/synthesis gas separation The hydrogen-carbon monoxide-methane system [PB82-200637] p 95 N83-12208

Catalyst and reactor development for a liquid-phase Fischer-Tropsch process [DE82-003369] p 105 N83-14207

Investigation of the hydrochlorination of SiCl₄ [NASA-CR-169621] p 58 N83-14668

SYNTHETIC FUELS

Developing technologies for synthetic fuels p 78 A83-10658
An experimental study of fuel combustion in a high-temperature air counterflow p 79 A83-14056

Literature survey of properties of syngases derived from coal [NASA-TM-82739] p 83 N83-10208

Soot formation in syngases [DE82-004271] p 94 N83-12199

Increased automobile fuel efficiency and synthetic fuels Alternatives for reducing oil imports [OTA-E-186] p 12 N83-13270

A compendium of syngas end use testing programs [PB82-236936] p 100 N83-13279

Catalyst and reactor development for a liquid-phase Fischer-Tropsch process [DE82-003369] p 105 N83-14207

The impact of petroleum, synthetic and cryogenic fuels on civil aviation [FAA-EM-82-29] p 106 N83-14291

SYSTEMS ANALYSIS

Alternative means of coping with national energy emergencies [DE82-002812] p 21 N83-15955

SYSTEMS ENGINEERING

A method of rating solar collectors p 29 A83-13701

Concerning the improvement of solar heating and cooling systems p 31 A83-15136

Transformation of wind energy by a high-altitude power plant p 117 A83-16112

Remote sensing of coal-fired MHD by optical diagnostic techniques [AIAA PAPER 83-0469] p 80 A83-16736

Modular small hydro configuration [PB82-184953] p 129 N83-12327

The design of the L-SAT solar array p 66 N83-14730

Energy policy formulation in South Africa. APL as a tool to identify options p 20 N83-14968

Conceptual design of the 6 MW MOD-5A wind turbine generator p 147 N83-15919

SYSTEMS SIMULATION

Economic modeling of fault tolerant flight control systems in commercial applications p 1 A83-11156

Power conditioning in an autonomous system controlled by a microprocessor Simulation of use with a photovoltaic generator — French thesis p 30 A83-13807

Comparative analysis of economic models in selected solar energy computer programs [PB82-184995] p 55 N83-12589

TECHNOLOGY ASSESSMENT

T

TABLES (DATA)

Intermediate photovoltaic system application experiment operational performance report. Volume 10 Newman Power Station, El Paso, Tex. [DE82-015791] p 48 N83-11588

Intermediate photovoltaic system application experiment operational performance report. Volume 10. Lovington Square Shopping Center, Lovington, N. Mex. (USA) [DE82-015792] p 49 N83-11589

TANKER SHIPS

Design and feasibility study for a portable oil recovery turbopump [NASA-CR-170704] p 110 N83-15628

TANTALUM OXIDES

The effect of Ta₂O₅ on the interaction between silicon and its contact metallization [NASA-TM-82948] p 45 N83-10554

TAR SANDS

Environmental monitoring of the Athabasca Oil Sands using Landsat data p 79 A83-11988

TECHNICAL WRITING

Authors guide to publishing in the fields of plasma physics and controlled fusion [DE82-002866] p 155 N83-16230

TECHNOLOGICAL FORECASTING

Secondary battery requirements for space use in the late 1980's 1990's [HL82/1200] p 165 N83-13627

The swing to concentrator arrays — solar arrays p 61 N83-14695

TECHNOLOGIES

Production technology of an electrolyte for Na/S batteries [BMFT-FB-T-82-065] p 161 N83-10614

TECHNOLOGY ASSESSMENT

Recent progress of amorphous-silicon solar-cell technology in Japan p 24 A83-11803
A manufacturer's perspective of measurement equipment needs for the photovoltaics industry p 32 A83-15454

Recent advances in amorphous silicon solar cells p 34 A83-15510

Advances in energy technology; Proceedings of the Eighth Annual UMR-DNR Conference on Energy, University of Missouri-Rolla, Rolla, MO, November 4-7, 1981 p 169 A83-17115

Biomass energy p 81 A83-18560

Aviation turbine fuels An assessment of alternatives [NASA-CR-169395] p 84 N83-10214

Alternative electric generation impact simulator [PB82-180324] p 3 N83-10302

Commercialization of parabolic dish systems p 44 N83-10540

Solar thermal technologies benefits assessment Objectives, methodologies and results for 1981 [NASA-CR-169373] p 4 N83-10551

Geothermal energy development in the United States [PB82-215146] p 6 N83-10636

Secondary battery requirements for space use in the late 1980's 1990's [HL82/1200] p 165 N83-13627

Assessment of research needs for advanced battery systems [PB82-227349] p 165 N83-13634

An assessment of gas-side fouling in cement plants [NASA-CR-169513] p 15 N83-13644

A family of thin high efficiency silicon solar cells p 62 N83-14703

Energy policy formulation in South Africa. APL as a tool to identify options p 20 N83-14968

Fusion materials Adapting to realistic reactor environments [DE82-002708] p 138 N83-15132

Assessment/review of methanol technology and utilization as a fuel [AD-A120109] p 109 N83-15489

The course of solar array welding technology development p 72 N83-15831

Silicon research and technology p 72 N83-15835

GaAs solar cells p 72 N83-15836

Blanket technology p 72 N83-15838

Magnetohydrodynamic power supply systems for space applications p 141 N83-15852

Overview of space reactors p 142 N83-15855

Technological boundary conditions for nuclear electric space power plants p 142 N83-15856

Gas cooled reactors for large space power needs p 142 N83-15858

Compact, high-power nuclear reactor systems based on small diameter particulate fuel p 143 N83-15859

The federal wind energy program p 146 N83-15909

Rocky Flats small wind systems program An update p 146 N83-15912

TECHNOLOGY TRANSFER

- USDOE activities in low-level radioactive waste treatment [DE82-001450] p 22 N83-16195
- ### TECHNOLOGY TRANSFER
- Technology spin-offs from the magnetic fusion energy program [DE82-016923] p 123 N83-10897
- Emerging technologies for the control of hazardous wastes [PB82-236993] p 17 N83-13666
- The NASA Redox Storage System Development project, 1980 [NASA-TM-82940] p 166 N83-14683
- Future developments and applications for the Space Telescope solar array p 67 N83-14737
- Small-scale energy-technology projects in the Pacific Territories. A case-study review [DE82-001338] p 67 N83-14751
- ### TECHNOLOGY UTILIZATION
- Ultralightweight solar array technology — spacecraft power p 66 N83-14729
- ### TEETERING
- The effect of yaw on horizontal axis wind turbine loading and performance [NASA-TM-82778] p 136 N83-14688
- ### TELEVISION RECEPTION
- Television interference and acoustic emissions associated with the operation of the Darnes VAWT p 149 N83-15934
- ### TELEVISION TRANSMISSION
- TV-SAT solar array p 64 N83-14714
- ### TEMPERATURE CONTROL
- Use of thermocapillary migration in a controllable heat valve p 156 A83-16093
- Transient shutdown of an axial-groove liquid trap heat pipe thermal diode p 157 A83-19161
- Controlling energy consumption in single buildings [AD-A118898] p 19 N83-14739
- Thermal management of large pulsed power systems p 145 N83-15889
- Two-phase heat transport for thermal control p 159 N83-15894
- ### TEMPERATURE DEPENDENCE
- Theoretical temperature dependence of short-circuit current of drift-field solar cells p 24 A83-11991
- Projected temperature dependence of quantum yields for photochemical reactions involving energy or electron transfer p 37 A83-18559
- ### TEMPERATURE DISTRIBUTION
- An analytical investigation of mass flow, pressure and temperature in a flat-plate solar collector p 37 A83-18452
- Telluride School, Telluride, Colorado solar-energy-system performance evaluation, February 1982 - April 1982 p 54 N83-12585
- ### TEMPERATURE EFFECTS
- Catalytic autothermal reforming increases fuel cell flexibility p 74 A83-11794
- Transient performance of evacuated tubular solar collectors p 27 A83-13478
- Results of testing a development module of the second-generation E-systems concentrating photovoltaic-thermal module [DE82-015671] p 46 N83-10598
- Reaction-induced temperature deviations during coal devolatilization in a heated grid [DE82-003864] p 106 N83-14300
- ### TEMPERATURE GRADIENTS
- Startup conditions of alkali-metal vaporization from rectangular channels — in heat pipes p 157 A83-18446
- ### TEMPERATURE MEASUREMENT
- The prediction of the thermal performance of building by the CR-method — heat storage and transmission [CSIR-BRR-396] p 161 N83-11578
- ### TEMPERATURE MEASURING INSTRUMENTS
- Evaluation of methods for rapid determination of freezing point of aviation fuels [NASA-CR-167981] p 83 N83-10207
- ### TEMPERATURE PROFILES
- Community heat-pump system, Klamath County, Oregon [DE82-015106] p 5 N83-10600
- Stress studies in EPG [NASA-CR-169640] p 60 N83-14677
- ### TENNESSEE VALLEY (AL-KY-TN)
- Biomass fuels update TVAs biomass fuels program [DE82-904990] p 89 N83-10613
- Geothermal-resource survey of the Tennessee Valley Region [DE82-021951] p 98 N83-12706
- ### TENSILE PROPERTIES
- Feasibility study of solid surface subreflector production techniques [NASA-CR-169642] p 60 N83-14678

TERRAIN ANALYSIS

- An assessment of wind energy resource for northwestern California p 80 A83-18456

TERRESTRIAL RADIATION

- Direct conversion of infrared radiant energy for space power applications p 73 N83-15865

TEST FACILITIES

- End region effects upon the performance of a magnetohydrodynamic channel p 113 A83-10665
- NOx formation experiments in an MHD simulation facility p 116 A83-16103
- Coal preparation and testing p 86 N83-10573
- Installation of a diesel engine combustion/ignition evaluation facility [AD-A119810] p 104 N83-14189
- Primary calibration of high efficiency solar cells. A comparison of 1980 data from CNES, Nasa (Lewis), JPL and RAE p 64 N83-14717
- Large infrared test rig for vacuum temperature cycling tests in the ESTEC DTC p 65 N83-14720
- Lawrence Berkeley Laboratory neutral-beam engineering test facility power-supply system [DE82-003044] p 137 N83-15104
- Thermal energy storage testing facilities [DE82-000110] p 168 N83-15948
- The MFTF-B plasma diagnostic system [DE82-002594] p 155 N83-16226

TESTING TIME

- A simple parameter measurement system for solar cells p 38 A83-18825

TETHERED BALLOONS

- Transformation of wind energy by a high-altitude power plant p 117 A83-16112

TETHERLINES

- Technical and economical assessment on Tethered Wind-Energy Systems (TWES) [DE82-017120] p 121 N83-10604

TEXAS

- Geologic studies of geopressured and hydropressured zones in Texas. Test well site selection [PB82-220542] p 94 N83-11653
- Hydrogeochemical and stream-sediment reconnaissance basic data for Beaumont, Lake Charles and Baton Rouge quadrangles, Texas, Louisiana Uranium Resource Evaluation Project [DE82-020438] p 102 N83-13554

TEXTURES

- Textured solar cell covers for light weight and high performance p 66 N83-14728

THERMAL ABSORPTION

- Evaluation of thermophotovoltaic conversion efficiency p 35 A83-16086

THERMAL BATTERIES

- Thermal battery systems for ordnance fuzing [AD-A119155] p 163 N83-13590

THERMAL BUCKLING

- Magnetoelastic instabilities and vibrations of superconducting-magnet systems [DE82-015206] p 123 N83-10880

THERMAL CONDUCTIVITY

- Growth of diamondlike films for power applications p 170 N83-15880

THERMAL CYCLING TESTS

- Large infrared test rig for vacuum temperature cycling tests in the ESTEC DTC p 65 N83-14720

THERMAL DECOMPOSITION

- Production of hydrogen by direct thermal decomposition of water - Preliminary investigations p 75 A83-16042
- Hydrogen as a vector for central receiver solar utilities p 75 A83-16044
- Gasification kinetics for biomass decomposition [PB82-139043] p 97 N83-12256

THERMAL ENERGY

- Approach to Nitinol power plant cost analysis p 112 A83-10656
- Solar thermal technologies benefits assessment Objectives, methodologies and results for 1981 [NASA-CR-169373] p 4 N83-10551
- Investigation of heat storage for temperature range from 200 to 500 C [BMFT-FB-T-82-105] p 161 N83-10627
- Development of enhanced heat transfer/transport/storage slurries for thermal-system improvement [DE82-021236] p 158 N83-12387
- Optimal sizing of heating systems that store and use thermal energy [DE82-003011] p 164 N83-13609
- Seasonal thermal storage Swedish practice, developments and cost projections [PB82-23231] p 165 N83-13635
- Technology assessment of solar thermal energy applications in wastewater treatment [PB82-229790] p 58 N83-13672

SUBJECT INDEX

- Industrial thermal energy storage What are the possibilities? [DE82-001494] p 166 N83-14748
- The ORNL Thermal Energy Storage Program Technical support [DE81-030805] p 168 N83-15943
- The ORNL Thermal Energy Storage Program [DE81-032001] p 168 N83-15944
- Advanced high-temperature thermal energy storage media for industrial applications p 168 N83-15945
- Evaluation of olivine ceramic refractories for thermal-energy-storage application [DE82-000108] p 168 N83-15947
- Thermal energy storage testing facilities [DE82-000110] p 168 N83-15948
- Field evaluation and assessment of thermal energy storage for residential space heating [DE82-000164] p 168 N83-15949
- Mathematical modeling of TES subsystems [DE82-000168] p 168 N83-15950
- ### THERMAL INSULATION
- Theoretical and experimental investigation of high temperature insulators subjected to intense visible radiation [AIAA PAPER 83-0158] p 35 A83-16562
- Economical optimized thermal insulation in buildings [BMFT-FB-T-82-131] p 8 N83-11594
- Thermal management of large pulsed power systems p 145 N83-15889
- ### THERMAL MAPPING
- Thermal infrared sensing applied to energy conservation in building envelopes /Thermosense IV/, Proceedings of the Meeting, Ottawa, Ontario, Canada, September 1-4, 1981 p 2 A83-12686
- Environmental monitoring of the Athabasca Oil Sands Region p 80 A83-14238
- ### THERMAL STABILITY
- Black chrome solar selective coatings optimized for high temperature applications p 33 A83-15479
- An investigation of deposition parameter dependence of optical properties, microstructure and thermal stability of black chrome selective surfaces p 34 A83-15497
- Break-in, performance and endurance tests results on fixed displacement hydraulic fluid power vane pumps [AD-A117962] p 128 N83-11504
- Comments on thermal runaway experiments in sub-ignition Tokamaks [IPPJ-610] p 131 N83-12997
- ### THERMAL STRESSES
- Thermal response of solar receiver aperture plates during sun walk-off [ASME PAPER 82-HT-33] p 25 A83-12791
- Environmental Research Guiding Committee report [PB82-220070] p 6 N83-10661
- Large-area sheet task advanced dendritic web growth development [NASA-CR-169637] p 59 N83-14675
- ### THERMAL VACUUM TESTS
- Large infrared test rig for vacuum temperature cycling tests in the ESTEC DTC p 65 N83-14720
- Space Telescope Solar panel assembly thermal test analysis p 65 N83-14724
- ### THERMIONIC CATHODES
- Thermionically emitting copper cathode in contact with combustion plasmas p 116 A83-16101
- ### THERMIONIC CONVERTERS
- A method for analyzing thermionic-converter batteries p 119 A83-19609
- External ionization mechanisms for advanced thermionic converters p 120 N83-10496
- Thermionic technology for spacecraft power Progress and problems p 145 N83-15887
- A survey of recent advances in and future prospects for thermionic energy conversion p 145 N83-15888
- ### THERMIONIC EMITTERS
- Thermionic conversion for space power application p 144 N83-15886
- ### THERMIONIC POWER GENERATION
- Effects of reactor design, component characteristics and operating temperatures on direct conversion power systems p 142 N83-15857
- Thermionic conversion for space power application p 144 N83-15886
- Thermionic technology for spacecraft power Progress and problems p 145 N83-15887
- A survey of recent advances in and future prospects for thermionic energy conversion p 145 N83-15888
- Power conversion Overview p 145 N83-15898
- ### THERMOCHEMICAL PROPERTIES
- Literature survey of properties of synfuels derived from coal [NASA-TM-82739] p 83 N83-10208

SUBJECT INDEX

Use of oxide decompositions in advanced thermochemical hydrogen cycles for solar heat sources
Experimental results on the low-temperature reactions for the incobalt tetraoxide-cobalt monoxide pair
[DE82-002390] p 77 N83-15958

THERMOCHEMISTRY

Liquid phase thermochemical energy conversion systems - An application of Diels-Alder chemistry
p 118 N83-17149

Thermochemical heat storage State-of-the-art report
[PB82-188087] p 162 N83-11610

Material properties of Green River oil shale
[DE82-003271] p 111 N83-15801

THERMOCINES

An experimental study of single medium thermocline thermal energy storage
[ASME PAPER 82-HT-53] p 26 N83-12800

THERMODYNAMIC CYCLES

Technological boundary conditions for nuclear electric space power plants p 142 N83-15858

Compact, high-power nuclear reactor systems based on small diameter particulate fuel p 143 N83-15859

THERMODYNAMIC EFFICIENCY

End region effects upon the performance of a magnetohydrodynamic channel p 113 N83-10665

Performance results of a 300 MWth generator at high magnetic field
[AIAA PAPER 83-0394] p 117 N83-16690

Performance and emissions characteristics of aqueous alcohol flames in a DI diesel engine
[NASA-CR-167917] p 96 N83-12250

THERMODYNAMIC PROPERTIES

The heat capacity of coal chars p 83 N83-10206

Investigation of the performance of a Ford 4 L 6 cylinder SI engine operating on methanol iso-butanol gasoline fuel blends
[AD-A117746] p 84 N83-10426

Application of the subatmospheric engine to solar thermal power p 45 N83-10546

Computer simulation and molecular theory studies of natural gas mixtures
[PB82-22060] p 92 N83-11349

Thermodynamic data for desulfurization processes
[PB82-184904] p 95 N83-12207

Heat pipe thermal switch
[NASA-CASE-GSC-12812-1] p 159 N83-12525

Comments on thermal runaway experiments in sub-ignition Tokamaks
[IPPJ-610] p 131 N83-12997

THERMODYNAMICS

Analysis of two-phase flow solar collectors with application to heat pumps p 27 N83-13481

THERMOELECTRIC GENERATORS

Hybrid thermoelectric solar collector design and analysis p 27 N83-13482

Performance results of a 300 MWth generator at high magnetic field
[AIAA PAPER 83-0394] p 117 N83-16690

THERMOELECTRIC POWER GENERATION

Research on the characteristic parameters of thermophotovoltaic /TPV/ converter performance
p 24 N83-12029

A method for analyzing thermionic-converter batteries
p 119 N83-19609

Effects of reactor design, component characteristics and operating temperatures on direct conversion power systems p 142 N83-15857

Status of thermoelectronic laser energy conversion, TELEC
p 143 N83-15864

THERMOGRAVIMETRY

Experimental results of a nonconventional energy conversion pilot facility-thermogravimetric system
[CISE-1754] p 103 N83-13629

THERMOHYDRAULICS

The effect of the parameters of metal-fiber capillary structures on the maximum heat-transfer capability of thermal pipes p 156 N83-11515

THERMOMIGRATION

Use of thermocapillary migration in a controllable heat valve p 156 N83-16093

THERMONUCLEAR POWER GENERATION

Neutron attenuation in the laser ducts of an inertial-confinement fusion reactor
[DE82-007195] p 126 N83-10947

Energy and technology review
[DE82-019371] p 137 N83-14747

THERMONUCLEAR REACTIONS

Protection of large capacitor banks
[DE82-017353] p 120 N83-10366

Methods to enhance blanket power density
[DE82-017467] p 127 N83-10958

THERMOPHYSICAL PROPERTIES

Material properties of Green River oil shale
[DE82-003271] p 111 N83-15801

THETA PINCH

Analysis of stabilization effect of quadrupole field on theta pinch plasmas
[IPPJ-608] p 131 N83-12995

Analytical and numerical calculations of field-reversed Theta-pinch equilibria based on a generalized Hill's vortex model
[DE82-003150] p 139 N83-15139

Multidimensional MHD computations for the field-reversed theta pinch and the reversed-field pinch
[DE82-004361] p 139 N83-15142

THICK FILMS

Development of an all-metal thick film cost effective metallization system for solar cells
[NASA-CR-169635] p 59 N83-14674

THICKNESS

The effect of thickness on the performance of molten carbonate fuel cell cathodes p 115 N83-15869

Study of the freezing pressure acting on a shaft lining
p 110 N83-15732

THIN FILMS

Direct-gap group IV semiconductors based on tin
p 22 N83-10294

Status of new thin-film photovoltaic technologies
p 23 N83-11510

A p-n heterojunction model for the thin-film CuInSe₂/CdS solar cell p 30 N83-14513

Heat-treatment studies on thin-film CdS/Cu_x/S solar cells p 35 N83-16084

Stability of SnO₂ thin films used for photovoltaic devices p 38 N83-18563

Thin film concentrator panel development
p 42 N83-10529

Study of the photovoltaic effect in thin film barium titanate
[NASA-CR-169435] p 46 N83-10567

Research and development on a MIS thin film solar cell made of amorphous silicon
[BMFT-FB-T-82-078] p 47 N83-10620

Recent developments in thin silicon solar cells
p 68 N83-15809

Air Force development of thin GaAs solar cells
p 69 N83-15816

Progress toward thin-film GaAs solar cells using a single-crystal Si substrate with a Ge interlayer
p 69 N83-15817

A preliminary evaluation of a potential space worth encapsulant p 72 N83-15832

Coating of laser fusion targets by plasma polymerized organic thin films p 152 N83-16126

THIN PLATES

Contact stresses on a thin plate after large displacements to a full parabolic surface
[DE82-005712] p 55 N83-13504

THOMSON SCATTERING

The Doublet III Thomson-scattering-system hemiconcentric triplet lens p 123 N83-10908

Apparatus for plasma electron temperature and density measurements by Thomson scattering
p 153 N83-16134

THREE DIMENSIONAL FLOW

Coupled three-dimensional flow and electrical calculations for Faraday MHD generators
p 117 N83-16107

Three-dimensional fluid and electrodynamic modeling for MHD DCW channels
[AIAA PAPER 83-0464] p 117 N83-16732

Gust structure analysis for WECS Design and performance analysis
[DE82-005321] p 137 N83-14746

Analysis of preburn three-dimensional flow patterns in underground coal conversion
[DE82-002405] p 110 N83-15496

THRUST CONTROL

Aircraft thrust/power management can save defense fuel, reduce engine maintenance costs, and improve readiness
[GAO/PLRD-82-74] p 18 N83-14074

TIME DEPENDENCE

Computational methods in Tokamak transport
[DE82-016616] p 132 N83-13006

Reaction-induced temperature deviations during coal devolatilization in a heated grid
[DE82-003864] p 106 N83-14300

A time resolving method for determining the energy spectrum of neutrons emitted by a plasma focus device
p 153 N83-16133

TIME SERIES ANALYSIS

NECAP 4.1: NASA's Energy Cost Analysis Program thermal response factor routine
[NASA-CR-165982] p 4 N83-10562

TIN

Direct-gap group IV semiconductors based on tin
p 22 N83-10294

TIN COMPOUNDS

Role of tin catalysts in the hydroliquefaction of coal -- hydrocracking p 81 N83-10131

TIN OXIDES

Stability of SnO₂ thin films used for photovoltaic devices p 38 N83-18563

TITANATES

Synroc processing options -- processing nuclear reactor wastes using a titanate based ceramic
[DE82-004230] p 17 N83-13976

TITANIUM CARBIDES

The optical properties of titanium nitrides and carbides
Spectral selectivity and photothermal conversion of solar energy p 33 N83-15490

TITANIUM NITRIDES

The optical properties of titanium nitrides and carbides
Spectral selectivity and photothermal conversion of solar energy p 33 N83-15490

TITANIUM OXIDES

Thermodynamics and photoelectrochemical behavior of the n-TiO₂ electrode in fluoride containing solutions
[AD-A118144] p 58 N83-14179

TOKAMAK DEVICES

Plasma equilibrium and field diffusion during current rise phase of STP-2 screw pinch Tokamak
[IPPJ-594] p 123 N83-10919

US-Japan Workshop on Burning Plasma Physics and Engineering
[IPPJ-599] p 124 N83-10921

Measurements of magnetic field fluctuations in the Caltech research Tokamak p 124 N83-10925

Measurements of fusion reactions from a Tokamak plasma -- plasma diagnostics p 124 N83-10926

Radial effects in heating and thermal stability of a sub-ignited Tokamak
[DE82-009384] p 124 N83-10932

Antenna-plasma coupling theory for ICRF heating of large tokamaks
[DE82-013226] p 125 N83-10933

Lower hybrid RF current drive and electron-cyclotron heating on the Versator 2 Tokamak
[DE82-017127] p 125 N83-10934

Observation of the parametric decay instability during electron cyclotron resonance heating on the Versator 2 Tokamak
[DE82-012573] p 125 N83-10939

Rippling modes in the edge of a Tokamak plasma
[DE82-007724] p 125 N83-10940

Resistive MHD studies of high-beta Tokamak plasmas
[DE82-008101] p 126 N83-10942

Fusion reactor plasma-performance modeling
POPCON analysis
[DE82-018364] p 126 N83-10943

Second-cyclotron-harmonic emission measurements on ISX-B
[DE82-009838] p 126 N83-10949

Review of plasma-impurity sources during Tokamak operation
[DE82-017098] p 126 N83-10951

Faraday-rotation measurements in ISX-B
[DE82-011507] p 127 N83-10953

Neutral-beam deposition in large, finite-beta noncircular Tokamak plasmas
[DE82-008146] p 127 N83-10957

Sufficient stability condition for alpha-driven velocity-space modes in compression Tokamak
[IPPJ-609] p 131 N83-12996

Comments on thermal runaway experiments in sub-ignition Tokamaks
[IPPJ-610] p 131 N83-12997

Computational methods in Tokamak transport
[DE82-016616] p 132 N83-13006

Lower-hybrid-heating experiments on the Alcator C and the Versator II Tokamaks
[DE82-013674] p 132 N83-13007

Fusion research at ORNL
[DE82-017766] p 134 N83-13994

Pooidal ohmic heating in a multipole
[DE82-019888] p 134 N83-13998

Resistive MHD studies of high-beta-Tokamak plasmas
[DE82-001478] p 139 N83-15141

Deuteron flux measurements in the edge plasmas of PLT and PDX during auxiliary heating experiments
[DE82-001809] p 139 N83-15143

Eleventh Czechoslovak Seminar on Plasma Physics and Technology
[IPPCZ-244] p 150 N83-16114

Tokamak research in the Soviet Union
p 150 N83-16115

Lower-hybrid heating experiment on the TM-1-MH Tokamak
p 150 N83-16116

Power spectrum optimization of the three-waveguide grill for the T-7 Tokamak
p 150 N83-16117

Short wavelength lower hybrid waves nonlinearly excited due to ponderomotive density modulation
p 151 N83-16118

TOOLING

- Electron impact ionization of highly charged molybdenum impurities in Tokamak plasmas p 151 N83-16119
- ANDROMEDA** The system for the acquisition and numerical data processing and its application for experimental device Tokamak TM-1-MH p 151 N83-16120
- Soft X-ray diagnostics on Tokamak TM-1-MH p 151 N83-16121
- Energy balance in TM-1-MH Tokamak (ohmic heating) p 151 N83-16122
- Global model of a hybrid Tokamak reactor with an auxiliary RF heating p 153 N83-16137
- Physics (selected articles) p 154 N83-16143
- [AD-A119830] p 154 N83-16143
- Effect of low-frequency density fluctuations on ion-cyclotron waves p 155 N83-16222
- [DE82-002829] p 155 N83-16222
- Study of the ionic distribution and of the energy deposition in a plasma of Tokamak heated by injection of fast neutrals p 155 N83-16226
- [EUR-CEA-FC-1094] p 155 N83-16226
- Engineering features of the INTOR conceptual design [DE82-002808] p 156 N83-16232
- CAMAC based inter-computer communications system [DE82-002879] p 156 N83-16233
- TOOLING**
- Feasibility study of solid surface subreflector production techniques [NASA-CR-169642] p 60 N83-14678
- TOPOGRAPHY**
- Site characteristics for wind energy conversion devices p 130 N83-12528
- TOROIDAL DISCHARGE**
- Equilibrium poloidal field distributions in reversed-field-pinch toroidal discharges [DE82-014130] p 134 N83-13996
- TOROIDAL PLASMAS**
- Toroidal flow coal-fired MHD combustor design study and tests [AIAA PAPER 83-0467] p 118 A83-16734
- Lower hybrid RF current drive and electron-cyclotron heating on the Versator 2 Tokamak [DE82-017127] p 125 N83-10934
- Fusion research at ORNL [DE82-017766] p 134 N83-13994
- Conceptual design for a modular-stellarator fusion-reactor magnet [DE82-002863] p 138 N83-15135
- Analytical and numerical calculations of field-reversed Theta-pinch equilibria based on a generalized Hill's vortex model [DE82-003150] p 139 N83-15139
- High-n collisionless ballooning modes in axisymmetric toroidal plasmas [DE82-002831] p 154 N83-16217
- CAMAC based inter-computer communications system [DE82-002879] p 156 N83-16233
- TORQUE**
- Energy efficient face seal [NASA-CR-165591] p 21 N83-15659
- TOWERS**
- WECS-load controlled pitch-variable load conversion to heat [DE82-014683] p 121 N83-10602
- TOXIC HAZARDS**
- Analysis of treated sludges and associated leachates from coal-conversion facilities [DE82-001488] p 103 N83-13650
- Study of the formation of submicron particulates generated by coal combustion [DE82-003268] p 21 N83-15401
- TOXICITY**
- Development of newer methods for the isolation and identification of certain components found in complex mixtures derived from energy sources and the determination of their toxicity via bioassay systems [DE82-019043] p 81 N83-10140
- Superior heat-transfer fluids for solar heating and cooling applications Results of acute oral-toxicity determinations [DE82-002758] p 52 N83-12560
- TRACE CONTAMINANTS**
- Microstructure of coal p 87 N83-10576
- TRANSFORMERS**
- Design and testing of a 13.75 MW converter for a superconducting magnetic-energy-storage system [DE82-002385] p 166 N83-14749
- TRANSIENT HEATING**
- Thermal response of solar receiver aperture plates during sun walk-off [ASME PAPER 82-HT-33] p 25 A83-12791
- TRANSIENT RESPONSE**
- Transient flow analysis of the AEDC/HPDE MHD generator [AIAA PAPER 83-0395] p 117 A83-16691

SUBJECT INDEX

- NECAP 4.1 NASA's Energy Cost Analysis Program thermal response factor routine [NASA-CR-165982] p 4 N83-10562
- TRANSISTORS**
- Improved transistorized AC motor controller for battery powered urban electric passenger vehicles [NASA-CR-167978] p 120 N83-10349
- TRANSITION METALS**
- Layered transition metal thiophosphates /MPX3/ as photoelectrodes in photoelectrochemical cells p 33 A83-15483
- TRANSMISSION EFFICIENCY**
- Transport of solar energy with optical fibres p 29 A83-13698
- TRANSMISSION LINES**
- Superconducting-transmission-line project at the Los Alamos National Laboratory [DE82-021835] p 158 N83-12344
- TRANSMITTANCE**
- Transmittance of reflected diffuse radiation --- for solar collectors p 38 A83-18564
- TRANSPORT AIRCRAFT**
- Energy efficient engine Flight propulsion system preliminary analysis and design [NASA-CR-159859] p 9 N83-12094
- TRANSPORT PROPERTIES**
- Gasification kinetics for biomass decomposition [PB82-198043] p 97 N83-12256
- Transport of light-ion beams in plasma channels [DE82-001649] p 139 N83-15140
- TRANSPORT THEORY**
- Computational methods in Tokamak transport [DE82-016618] p 132 N83-13006
- Lower-hybrid-heating experiments on the Alcator C and the Versator II Tokamaks [DE82-013674] p 132 N83-13007
- Dynamics of ionization and transport in a magnetically confined plasma column p 153 N83-16132
- TRANSPORTATION ENERGY**
- Application of fuel cells to highway and nonhighway transportation [DE82-004365] p 156 N83-16259
- TRANSPORTATION NETWORKS**
- The modal split in the Japanese passenger transportation system [DFVLR-FB-82-09] p 9 N83-11887
- TRAPPED PARTICLES**
- Production and experimental study of the dissipative trapped ion instability p 123 N83-10910
- TRITIUM**
- Comments on thermal runaway experiments in sub-ignition Tokamaks [IPJP-610] p 131 N83-12997
- Analysis of target implosion irradiated by proton beam 1. Beam interaction with target plasma [IPJP-612] p 134 N83-13989
- Tritium waste control October 1980 - March 1981 [DE82-002088] p 20 N83-14774
- Coating of laser fusion targets by plasma polymerized organic thin films p 152 N83-16126
- TROMBE WALLS**
- Telluride School, Telluride, Colorado solar-energy-system performance evaluation, February 1982 - April 1982 p 54 N83-12585
- TROPICAL METEOROLOGY**
- Technical Conference on Climate Africa [WMO-596] p 170 N83-12736
- TROUGHS**
- Structural design considerations for a line-focus reflective module using inexpensive composite materials [DE82-021611] p 54 N83-12587
- Development effort of Sheet Molding Compound (SMC) parabolic trough panels [DE82-000841] p 67 N83-14761
- TUBE HEAT EXCHANGERS**
- Performance investigation of a long, slender heat pipe for thermal energy storage applications --- for solar residential heating p 159 A83-10651
- TUNDRA**
- Arctic terrestrial environment research programs of the Office of Energy Research, Department of Energy: Evaluation and recommendations [PB82-197088] p 9 N83-11634
- Effects of oil on tundra ponds and streams [DE82-018899] p 15 N83-13649
- TUNGSTEN CARBIDES**
- Energy efficient face seal [NASA-CR-165591] p 21 N83-15659
- TURBINE BLADES**
- Wind turbine blades A study of prototypes in a steady regime - Unsteady considerations [AAAF PAPER NT 81-17] p 113 A83-11777
- The spectrum of wind speed fluctuations encountered by a rotating blade of a wind energy conversion system p 114 A83-13695
- Investigations of the tornado wind energy system [DE82-017122] p 121 N83-10601
- Design and fabrication of composite blades for the Mod-1 wind turbine generator [NASA-CR-167987] p 128 N83-11579
- Horizontal and vertical axis wind turbines p 130 N83-12529
- High-Temperature-Turbine-Technology Program Phase 2 Technology test and support studies Turbine spool technology ng fuel-contaminant tolerance test [DE82-020287] p 101 N83-13464
- Structural-dynamic-response characteristics of Darneuse vertical axis wind turbines p 135 N83-14545
- [DE82-003583] p 135 N83-14545
- Fifth Biennial Wind Energy Conference and Workshop (WWE) p 146 N83-15908
- [DE82-014659] p 146 N83-15908
- The NASA Lewis large wind turbine program p 146 N83-15911
- Vertical axis wind turbine program p 147 N83-15913
- Operating experience with the 200 kW MOD-OA wind turbine generators p 147 N83-15916
- Operational experience on MP-200 series commercial wind turbine generators p 147 N83-15917
- Description of the 3 MW SWT-3 wind turbine at San Geronio Pass California p 147 N83-15922
- DOE/UTRC kW development program p 74 N83-15924
- Some innovative concepts in wind turbines of the axial-flow, cross-flow, and combined (dual) flow types p 149 N83-15935
- Recent progress in the development of the Musgrove vertical axis wind turbine p 149 N83-15937
- Atmospheric testing of a two bladed full controlled wind turbine with passive cyclic pitch variation p 149 N83-15938
- Optimization of the dynamic inducer wind turbine system p 150 N83-15940
- Experiments with a twin rotor, single bladed gyromill p 150 N83-15941
- TURBINE ENGINES**
- Aviation turbine fuels An assessment of alternatives [NASA-CR-169395] p 84 N83-10214
- Recent trends in aviation turbine fuel properties [NASA-TP-2058] p 92 N83-11340
- Energy efficient engine Flight propulsion system preliminary analysis and design [NASA-CR-159859] p 9 N83-12094
- TURBINE PUMPS**
- Modular small hydro configuration [PB82-184953] p 129 N83-12327
- Design and feasibility study for a portable oil recovery turbopump [NASA-CR-170704] p 110 N83-15628
- TURBOFAN ENGINES**
- The fuel efficient jet engine [PNR-90114] p 7 N83-11136
- TURBOGENERATORS**
- Test results of a medium temperature solar engine p 115 A83-16000
- A 400-kWe high-efficiency steam turbine for industrial cogeneration p 43 N83-10537
- TURBOMACHINERY**
- Interaction in limited arrays of windmills [DE82-750056] p 133 N83-13608
- TURBULENCE**
- Anisotropy in MHD turbulence due to a mean magnetic field [NASA-TM-84000] p 131 N83-12998
- Interaction in limited arrays of windmills [DE82-750056] p 133 N83-13608
- TURBULENCE WAKES**
- Mathematical model for the analysis of wind-turbine wakes p 117 A83-16108
- TWO PHASE FLOW**
- Analysis of two-phase flow solar collectors with application to heat pumps p 27 A83-13481
- Experimental results of a nonconventional energy conversion pilot facility-thermogravimetric system [CISE-1754] p 103 N83-13629
- TYPHOONS**
- The wind program in a typhoon environment p 148 N83-15927

- ULTRAVIOLET LASERS**
- Laser-isotope-separation technology [DE81-030114] p 104 N83-14197
- UNDERGROUND STORAGE**
- Preliminary design study of underground pumped hydro and compressed-air energy storage in hard rock Volume 8 Design approaches - UPH Appendix B Shafts [DE81-028202] p 164 N83-13607

- Compressed-air energy storage preliminary design and site-development program in an aquifer Volume 1: Executive summary [DE82-019284] p 164 N83-13810
- Compressed-air energy storage preliminary design and site-development program in an aquifer Volume 2: Utility-system planning [DE82-019993] p 164 N83-13811
- Thermal analysis of the position of the freezing front around an LNG in-ground storage tank with a heat barrier p 110 N83-15712
- Survey of utility load management projects Third revised report [DE82-000888] p 169 N83-15957
- UNDERGROUND STRUCTURES**
- Resource targets for advanced underground coal extraction systems [NASA-CR-169429] p 85 N83-10503
- Evaluation of the Kioswall longwall mining system [DE82-003881] p 89 N83-10606
- Earth-covered buildings An exploratory analysis for hazard and energy performance [PB82-189564] p 10 N83-12285
- Economic comparison of CAES designs employing hardrock, salt and aquifer storage reservoirs [DE82-003833] p 167 N83-14758
- Analysis of preburn three-dimensional flow patterns in underground coal conversion [DE82-002405] p 110 N83-15496
- UNDERWATER RESOURCES**
- A groundwater convection model for Rio Grande rift geothermal resources p 79 A83-11831
- UNSTEADY FLOW**
- Wind turbine blades A study of prototypes in a steady regime - Unsteady considerations [AAAF PAPER NT 81-17] p 113 A83-11777
- Transient flow analysis of the AEDC/HPDE MHD generator [AIAA PAPER 83-0395] p 117 A83-16691
- UNSTEADY STATE**
- Helium population model p 154 N83-16139
- UPPER ATMOSPHERE**
- Technical and economical assessment on Tethered Wind-Energy Systems (TWES) [DE82-017120] p 121 N83-10604
- UPPER VOLTA**
- Study of ground winds in Upper Volta Economic and agronomic consequences for the Sudan-Sahel region of west Africa p 98 N83-12751
- URANIUM**
- Remote sensing and uranium exploration at Lisbon Valley, Utah p 77 A83-10032
- Hydrogeochemical and stream-sediment reconnaissance basic data for Utica quadrangle, New York Uranium Resource Evaluation Project [DE82-020429] p 102 N83-13552
- Hydrogeochemical and stream-sediment reconnaissance basic data for Beaumont, Lake Charles and Baton Rouge quadrangles, Texas, Louisiana Uranium Resource Evaluation Project [DE82-020438] p 102 N83-13554
- Hydrogeochemical and stream-sediment reconnaissance basic data for Ogdensburg and Lake Champlain quadrangles, New York, Vermont Uranium Resource Evaluation Project [DE82-020417] p 102 N83-13557
- Hydrogeochemical and stream-sediment reconnaissance basic data for Jenkins Quadrangle, Kentucky, Virginia, West Virginia Uranium resource evaluation project [DE82-020431] p 102 N83-13558
- Laser-isotope-separation technology [DE81-030114] p 104 N83-14197
- Geochemical studies of cores from the San Juan Basin Research Site, Grants Uranium Region, New Mexico [DE82-004153] p 108 N83-14795
- URBAN PLANNING**
- Proceedings of the US Department of Energy/Argonne National Laboratory Contractors' Research and Development Workshop Converting Waste to Energy [DE82-014337] p 87 N83-10578
- URBAN TRANSPORTATION**
- Improved transistorized AC motor controller for battery powered urban electric passenger vehicles [NASA-CR-167978] p 120 N83-10349
- Vehicle characterization for the TAPCUT Project: Performance and cost [DE82-019772] p 13 N83-13465
- USER MANUALS (COMPUTER PROGRAMS)**
- Users manual for WIND p 130 N83-12534
- ROSET A solar-thermal electric-power simulation users guide [DE82-021997] p 53 N83-12567
- TI-59 program for calculating the annual energy requirements for residential heating and cooling. Volume 1 Users manual [DE82-010174] p 13 N83-13594
- TI-59 program for calculating the annual energy requirements for residential heating and cooling. Volume 2: Program reference manual [DE82-020275] p 13 N83-13595
- USER REQUIREMENTS**
- Prospects for foreign applications of wind-energy systems, preliminary report in response to Public Law 96-345 [DE82-007930] p 19 N83-14745
- UTILITIES**
- Wind power for the electric-utility industry Policy incentives for fuel conservation -- Book p 1 A83-11896
- Potential benefits from a successful solar thermal program p 3 N83-10547
- Cogeneration Energy Systems assessment. Volume 2. Technical discussion [PB82-200692] p 8 N83-11609
- ROSET A solar-thermal electric-power simulation users guide [DE82-021997] p 53 N83-12567
- Distributed photovoltaic systems Utility interface issues and their present status Intermediate/three-phase systems -- power conditioning [NASA-CR-169664] p 61 N83-14686
- Operating experience with the 200 kW MOD-OA wind turbine generators p 147 N83-15916
- UTILIZATION**
- Industrial thermal energy storage What are the possibilities? [DE82-001494] p 166 N83-14748
- V**
- VACUUM**
- Crater formation by high current discharges in vacuum p 152 N83-16129
- VACUUM DEPOSITION**
- Effect of hydrogen on the deposition rate for planar RF magnetron sputtering of hydrogenated amorphous silicon p 35 A83-16082
- VACUUM TUBE OSCILLATORS**
- The phototron A light to RF energy conversion device p 143 N83-15866
- VANES**
- Break-in, performance and endurance tests results on fixed displacement hydraulic fluid power vane pumps [AD-A117962] p 128 N83-11504
- Aerodynamic research on tipvane wind turbines [VTH-LR-355] p 128 N83-11603
- VAPOR DEPOSITION**
- Flat-plate collector research area Silicon material task p 41 N83-10519
- Development of a polysilicon process based on chemical vapor deposition, phase 1 [NASA-CR-169633] p 59 N83-14673
- VAPOR PHASE EPITAXY**
- Progress toward cascade cells made by OM-VPE -- organometallic vapor phase epitaxy p 69 N83-15813
- Radiation damage and annealing in large area n-p/p-p-GaAs shallow homojunction solar cells p 71 N83-15826
- VAPOR PHASES**
- Positive displacement rotary vapor compressor for vapor compression -- for waste steam utilization [PB82-227620] p 3 N83-10429
- VARIATIONAL PRINCIPLES**
- Extremal MHD generator p 117 A83-16110
- VEHICLES**
- NO sub x emission control for heavy duty vehicles Toward meeting a 1986 standard [PB82-183880] p 7 N83-10665
- VELOCITY**
- Ion velocity measurements for laser mass ablation studies p 152 N83-16128
- VERMONT**
- Hydrogeochemical and stream-sediment reconnaissance basic data for Ogdensburg and Lake Champlain quadrangles, New York, Vermont Uranium Resource Evaluation Project [DE82-020417] p 102 N83-13557
- VERTICAL AIR CURRENTS**
- Aerodynamics and performance testing of the VAWT [DE82-003574] p 137 N83-14760
- VERTICAL ORIENTATION**
- Horizontal and vertical axis wind turbines p 130 N83-12529
- Structural-dynamic-response characteristics of Darrieus vertical axis wind turbines [DE82-003583] p 135 N83-14545
- The 17-M VAWT program [DE82-003497] p 137 N83-14758
- Recent progress in the development of the Musgrove vertical axis wind turbine p 149 N83-15937
- Experiments with a twin rotor, single bladed gyromill p 150 N83-15941
- VIRGINIA**
- Hydrogeochemical and stream-sediment reconnaissance basic data for Jenkins Quadrangle, Kentucky, Virginia, West Virginia Uranium resource evaluation project [DE82-020431] p 102 N83-13558
- VISUAL AIDS**
- Development of a slide program describing a site selection process for small Wind-Energy-Conversion Systems (SWECS) [DE82-017394] p 99 N83-12788
- VITRIFICATION**
- Vitrification of high-level radioactive waste in a small-scale joule-heated ceramic melter [DE82-002227] p 21 N83-15113
- VOLT-AMPERE CHARACTERISTICS**
- End region effects upon the performance of a magnetohydrodynamic channel p 113 A83-10665
- On the formula for the upper limit of photovoltaic solar energy conversion efficiency p 23 A83-10699
- Exactly soluble model for a solar cell with nonlinear recombination p 24 A83-11811
- Theoretical temperature dependence of short-circuit current of drift-field solar cells p 24 A83-11991
- Process for high photocurrent in IBC solar cells -- Interdigitated Back Contact p 24 A83-12059
- The influence of the interface state on the properties of solar cell semiconductor electrodes p 26 A83-13473
- Solar cell device physics -- Book p 27 A83-13501
- A new method for experimental determination of the series resistance of a solar cell p 30 A83-14512
- Schottky revisited -- model limitations and steps for extending treatment to solar cell structures p 34 A83-15509
- Changes in photovoltaic and dark electrical properties of hydrogenated amorphous silicon diodes induced by forward bias carrier injection p 34 A83-16021
- Transport mechanisms for Mg/Zn3P2 junctions p 35 A83-16071
- Field ionization of deep levels in semiconductors with applications to Hg/1-x/Cd/x/ Te p-n junctions p 158 A83-16089
- A simple parameter measurement system for solar cells p 38 A83-18825
- Photovoltaic properties of cadmium sulfide/trivalent-metal phthalocyanine heterojunction devices p 39 A83-19259
- A method for analyzing thermionic-converter batteries p 119 A83-19609
- VORTEX RINGS**
- Momentum theory, dynamic inflow, and the vortex-ring state p 116 A83-16026
- W**
- WAFERS**
- Precise estimates for the production of wafers from silicon ingots [NASA-CR-169517] p 55 N83-13583
- WALLS**
- Demonstration Tokamak power plant study [DE82-016182] p 125 N83-10937
- Methods to enhance blanket power density [DE82-017467] p 127 N83-10958
- WASHING**
- Improvement of the casing cementation of deep and ultradeep wells Part 1: Drilling muds and washing fluids [BMFT-FB-T-82-111-PT-1] p 92 N83-11364
- WASTE DISPOSAL**
- Institutional factors in resource recovery co-disposal demonstration project, Middlesex County, New Jersey, Spring 1980 - Summer 1981 p 4 N83-10588
- Energy recovery and cogeneration from an existing municipal incinerator p 5 N83-10589
- National Marine Pollution Program Plan. Federal plan for ocean pollution research, development and monitoring Fiscal years, 1981 - 1985 [PB82-218462] p 6 N83-10656
- Demonstration of synergistic industrial energy/municipal solid waste disposal facility [DE82-001145] p 99 N83-13041
- Analysis of treated sludges and associated leachates from coal-conversion facilities [DE82-001488] p 103 N83-13650
- Measuring program for the R and D project on gasification of domestic and industrial wastes [BMFT-FB-T-82-118] p 18 N83-13652

WASTE ENERGY UTILIZATION

- Emerging technologies for the control of hazardous wastes
[PB82-236993] p 17 N83-13666
- Recommendation on national radioactive waste management policies
[DE81-029916] p 17 N83-13972
- Parametric study of geohydrologic performance characteristics for nuclear-waste repositories
[DE82-003145] p 17 N83-13973
- Nuclear fuel cycle and waste management in France
[DE81-700732] p 104 N83-13975
- The experience collected in the management of the Centro Informazioni Studi Esperienze (CISE) radioactive waste from 1960 to 1980
[CISE-1738] p 17 N83-13977
- Energy resource recovery facility for Kent and Sussex counties, Delaware
[DE82-002539] p 19 N83-14753
- Cleaning up the environment Progress achieved but major unresolved issues remain
[GAO/CED-82-72] p 19 N83-14767
- Nuclear and coal waste disposal hampered by legal, regulatory and technical uncertainties
[EMD-82-63] p 19 N83-14770
- Coal fly ash disposal in the ocean An alternative worth considering
[DE82-003835] p 20 N83-14781
- Vitrification of high-level radioactive waste in a small-scale joule-heated ceramic melter
[DE82-002227] p 21 N83-15113
- Packaging of radioactive wastes for sea disposal
[IAEA-TECDOC-240] p 21 N83-15114
- Risks, regulation responsibilities and costs in nuclear waste management A preliminary survey in the European Community
[EUR-6893] p 21 N83-15115
- USDOE activities in low-level radioactive waste treatment
[DE82-001450] p 22 N83-16195

WASTE ENERGY UTILIZATION

- Case for a Space Center in the Arabian Gulf
p 2 A83-18812
- Positive displacement rotary vapor compressor for vapor compression — for waste steam utilization
[PB82-227620] p 3 N83-10429
- Proceedings of the US Department of Energy/Argonne National Laboratory Contractors' Research and Development Workshop Converting Waste to Energy
[DE82-014337] p 87 N83-10578
- A laboratory approach to obtain suspension combustion data for reuse derived fuels
p 87 N83-10579
- An oxygen flow calorimeter for determining the heating value of kilogram size samples of municipal solid waste
p 87 N83-10580
- An economic and engineering analysis of the full-scale trommel screen operations at Baltimore County, Maryland
p 87 N83-10581
- Characterization of RDF properties through high pressure differential scanning calorimetry
p 87 N83-10582
- Small-scale waste-to-energy systems A state-of-the-art report
p 4 N83-10583
- Solid waste to methane gas (RefCOM)
p 88 N83-10584
- The feasibility of refuse-fired energy generation in Philadelphia, Pennsylvania
p 88 N83-10587
- Energy recovery and cogeneration from an existing municipal incinerator
p 5 N83-10589
- Sewage sludge as a supplementary utility boiler fuel
p 88 N83-10590
- Absorption type water chiller fired directly by waste heat
[BMFT-FB-T-82-129] p 7 N83-11593
- Utilization of the waste heat of a steel work
[BMFT-FB-T-82-135] p 8 N83-11597
- Advanced regenerative heat recovery system
[PB82-200650] p 8 N83-11604
- Use of waste heat in district systems with considerations of seasonal-heat-demand variations
[DE82-019923] p 14 N83-13614
- Proceedings of the 3rd Conference on Waste Heat Management and Utilization
[PB82-227901] p 17 N83-13669
- Air circuit with heat pump — waste heat utilization in the production of paper
[PB82-221219] p 18 N83-14312
- Once-through heat transport and seasonal storage for city of Bellingham
[DE82-001501] p 169 N83-15956
- WASTE TREATMENT**
- An economic and engineering analysis of the full-scale trommel screen operations at Baltimore County, Maryland
p 87 N83-10581
- The feasibility of refuse-fired energy generation in Philadelphia, Pennsylvania
p 88 N83-10587

- Institutional factors in resource recovery co-disposal demonstration project, Middlesex County, New Jersey, Spring 1980 - Summer 1981
p 4 N83-10588
- Total energy food plant 21 million gallon ethanol facility
[DE82-019258] p 14 N83-13617
- SFW-Funk process for gasification of solid urban and industrial waste
[BMFT-FB-T-82-117] p 16 N83-13651
- Measuring program for the R and D project on gasification of domestic and industrial wastes
[BMFT-FB-T-82-118] p 16 N83-13652
- Emerging technologies for the control of hazardous wastes
[PB82-236993] p 17 N83-13666
- Technology assessment of anaerobic systems for municipal wastewater treatment. Part 1 Anaerobic fluidized bed Part 2 ANFLOW
[PB82-229170] p 17 N83-13670
- USDOE activities in low-level radioactive waste treatment
[DE82-001450] p 22 N83-16195

WASTE UTILIZATION

- The feasibility of refuse-fired energy generation in Philadelphia, Pennsylvania
p 88 N83-10587
- Institutional factors in resource recovery co-disposal demonstration project, Middlesex County, New Jersey, Spring 1980 - Summer 1981
p 4 N83-10588
- Urban waste as a potential source for brick plants
p 88 N83-10591
- Development of a solid waste fired fluidized boiler, phase 1
p 88 N83-10592
- Conversion of municipal solid waste to energy, Jacksonville, Florida
p 5 N83-10593
- Demonstration of landfill gas enhancement techniques in landfill simulators
p 88 N83-10594
- Research, development and demonstration in the design of sanitary landfill to optimize the generation and capture of compressible gas
p 89 N83-10595
- Landfill gas recovery An analysis of results
p 89 N83-10596
- Performance analysis of cofiring densified refuse derived fuel in a military boiler
[AD-A118022] p 93 N83-11583
- Utilization of ANCIT plant by-products
[BMFT-FB-T-82-144] p 94 N83-11600
- Questions and answers about energy recovery from waste
[DE82-022154] p 10 N83-12580
- Demonstration of synergistic industrial energy/municipal solid waste disposal facility
[DE82-001145] p 99 N83-13041
- Conversion of forest residues to a methane-rich gas in a high-throughput gasifier
[DE82-020289] p 102 N83-13601
- Investigation of engineering and design considerations in selecting conveyors for densified Refuse-Derived Fuel (dRDF) and dRDF Coal mixtures
[AD-A119065] p 107 N83-14495

WASTE WATER

- ANFLOW Characterization and development of an energy conserving wastewater treatment system
p 4 N83-10585
- Water hyacinth wastewater treatment system
p 88 N83-10586
- Proceedings of the conference on energy conservation Retrofit of Municipal Wastewater Treatment Facilities
[DE82-013710] p 5 N83-10612
- Reconstruction and testing of the flue gas desulfurizing plant Weiher 2
[BMFT-FB-T-82-108] p 91 N83-10652
- Technology assessment of anaerobic systems for municipal wastewater treatment Part 1 Anaerobic fluidized bed Part 2 ANFLOW
[PB82-229170] p 17 N83-13670
- Technology assessment of solar thermal energy applications in wastewater treatment
[PB82-229790] p 58 N83-13672
- WATER**
- Program of basic research on the utilization of coal-water mixture fuels
[DE82-002232] p 106 N83-14299
- Performance of labyrinth-stratified water-storage system for heating and cooling
[DE82-000107] p 168 N83-15946

WATER CIRCULATION

- Ice distribution and winter surface circulation patterns, Kachemak Bay, Alaska
p 1 A83-12038

WATER CONSUMPTION

- Water demand for generating electricity: A mathematical programming approach with application in Poland
[IIASA-RR-82-16] p 158 N83-10498

WATER FLOW

- An efficient fully implicit simulator
[CSS-126] p 109 N83-15322

WATER HEATING

- Production of hydrogen by direct thermal decomposition of water - Preliminary investigations
p 75 A83-16042
- WECS-load controlled pitch-variable load conversion to heat
[DE82-014683] p 121 N83-10602
- Running hot water A systems approach to energy conservation
[FOA-C-10202-M2] p 5 N83-10628
- Analytical and experimental analysis of procedures for testing solar domestic hot water systems
[PB82-184839] p 49 N83-12287
- Stevens Home, Rancho Santa Fe, California Solar-energy-system performance evaluation, Oct 1981 - Apr 1982
[DE82-021698] p 50 N83-12538
- Kalin Home, Long Island, New York Solar-energy-system performance evaluation, Sep 1981-Mar 1982
[DE82-021701] p 50 N83-12539
- EROS Data Center, Sioux Falls, South Dakota Solar-energy-system performance evaluation, Oct 1981 - Apr 1982
[DE82-021703] p 50 N83-12540
- Solar-energy-system performance evaluation, Cathedral Square, Burlington, Vermont, July - December 1981
[DE82-016999] p 52 N83-12563
- Williamson Home, Ipswich, Mass solar-energy-system performance evaluation, Nov 1981 - Apr 1982
[DE82-021300] p 53 N83-12574
- Isakson Home, Anoka, Minnesota solar-energy-system performance evaluation, Aug 1981 - Mar 1982
[DE82-021297] p 54 N83-12576
- Karasek Home, Blackstone, Massachusetts solar-energy-system performance evaluation, Nov 1981 - Mar 1982
[DE82-021302] p 54 N83-12577
- Guide to a geothermal heat plan A geothermal energy application, serial no 3
[DE82-020591] p 13 N83-13598
- Technology assessment of solar thermal energy applications in wastewater treatment
[PB82-229790] p 58 N83-13672
- Simplified solar fraction estimation for space and water heating at Department of Defense installations Appendix C Water heating nomographs
[AD-A120014] p 73 N83-15904
- Simplified solar fraction estimation for space and water heating at Department of Defense installations Appendix B Space heating nomographs
[AD-A120013] p 73 N83-15905
- The USDA agricultural wind energy research program
p 147 N83-15914

WATER INJECTION

- Operation of a steady-state pH-differential water electrolysis cell
p 75 A83-16041

WATER POLLUTION

- Experimental feasibility of the airborne measurement of absolute oil fluorescence spectral conversion efficiency
p 169 A83-18581
- National Marine Pollution Program Plan Federal plan for ocean pollution research, development and monitoring Fiscal years, 1981 - 1985
[PB82-218462] p 6 N83-10656
- Background levels and environmental cycling of petroleum hydrocarbons Multimedia monitoring requirements
p 11 N83-12630
- Packaging of radioactive wastes for sea disposal
[IAEA-TECDOC-240] p 21 N83-15114

WATER QUALITY

- Cleaning up the environment Progress achieved but major unresolved issues remain
[GAO/CED-82-72] p 19 N83-14767

WATER RESOURCES

- Assessment of high heat-transfer evaporators as power plant condensers to produce abundant freshwater
[PB82-198045] p 7 N83-11277

WATER TREATMENT

- ANFLOW Characterization and development of an energy conserving wastewater treatment system
p 4 N83-10585
- Water hyacinth wastewater treatment system
p 88 N83-10586
- Proceedings of the conference on energy conservation Retrofit of Municipal Wastewater Treatment Facilities
[DE82-013710] p 5 N83-10612
- Reconstruction and testing of the flue gas desulfurizing plant Weiher 2
[BMFT-FB-T-82-108] p 91 N83-10652
- Technology assessment of anaerobic systems for municipal wastewater treatment. Part 1 Anaerobic fluidized bed Part 2 ANFLOW
[PB82-229170] p 17 N83-13670
- Technology assessment of solar thermal energy applications in wastewater treatment
[PB82-229790] p 58 N83-13672

SUBJECT INDEX

WATER VAPOR

- Scale effects in liquefied fuel vapor dispersion [DE82-006198] p 11 N83-12659
- Symposium on Condensing Heat Exchangers Volume 2. Proceedings [PB82-240078] p 159 N83-13311

WATERWAVE ENERGY

- Estimation of wave power potential along the Indian coastline p 80 A83-17849

WAVE SCATTERING

- Apparatus for plasma electron temperature and density measurements by Thomson scattering p 153 N83-16134

WAVEGUIDES

- Faraday-rotation measurements in ISX-B [DE82-011507] p 127 N83-10953
- Power spectrum optimization of the three-waveguide gril for the T-7 Tokamak p 150 N83-16117

WEAPON SYSTEMS

- Improving energy efficiency of major weapon systems [AD-A119563] p 18 N83-14116

WEATHER FORECASTING

- The climate of Africa, including feasibility study of climate alert system p 170 N83-12737

WEBS (SHEETS)

- Large-area sheet task advanced dendritic web growth development [NASA-CR-169637] p 59 N83-14675

WEIGHT REDUCTION

- Air Force development of thin GaAs solar cells p 69 N83-15816
- A preliminary evaluation of a potential space worth encapsulant p 72 N83-15832

WELDED JOINTS

- Microstructural analysis of solar cell welds p 72 N83-15833
- Evaluation of solar cell welds by scanning acoustic microscopy p 72 N83-15834

WELDING

- Evaluation of electrode shape and nondestructive evaluation method for welded solar cell interconnects [NASA-TM-82966] p 45 N83-10555
- Welding of AL-MG alloy 5083-0 for the construction of LNG storage tanks p 93 N83-11500
- The course of solar array welding technology development p 72 N83-15831
- Microstructural analysis of solar cell welds p 72 N83-15833
- Evaluation of solar cell welds by scanning acoustic microscopy p 72 N83-15834
- Blanket technology p 72 N83-15838

WELLS

- Standardization of sampling and analysis of geopressured fluids Part 2 Monitoring of geopressured wells p 82 N83-10151
- Improvement of the casing cementation of deep and ultradeep wells Part 1 Drilling muds and washing fluids [BMFT-FB-T-82-111-PT-1] p 82 N83-11364
- Improvement of casing cementation of deep and ultradeep wells Part 2 Oilfield cements and cement additives [BMFT-FB-T-82-112-PT-2] p 93 N83-11365
- Geologic studies of geopressured and hydrogeopressured zones in Texas Test well site selection [PB82-220542] p 94 N83-11653

WEST GERMANY

- Retrospect of solar cell development in West Germany p 64 N83-14712

WEST VIRGINIA

- Hydrogeochemical and stream-sediment reconnaissance basic data for Manon, Canton, Pittsburgh and Cleveland quadrangles, Ohio, West Virginia, Pennsylvania. Uranium Resource Evaluation Project [DE82-020430] p 102 N83-13553
- Hydrogeochemical and stream-sediment reconnaissance basic data for Jenkins Quadrangle, Kentucky, Virginia; West Virginia. Uranium resource evaluation project [DE82-020431] p 102 N83-13558

WETLANDS

- The use of near color infrared photography to assess the impact of the oil and natural gas industry on Louisiana's wetlands p 1 A83-10069
- Developing Alaska's energy resources. Actions needed to stimulate research and improve wetlands permit processing [GAO/EMD-82-44] p 18 N83-14684

WIND DIRECTION

- Power augmentation in a Savonius-type wind-turbine by using a single air-deflecting vane p 115 A83-14725
- Candidate wind-turbine-generator site Data summary [DE82-020416] p 99 N83-12785

WIND MEASUREMENT

- A diagnostic model for estimating winds at potential sites for wind turbines p 79 A83-12954

The availability of wind energy in Hong Kong p 80 A83-14669

- An assessment of wind energy resource for northwestern California p 80 A83-18456
- Study of ground winds in Upper Volta: Economic and agronomic consequences for the Sudan-Sahel region of west Africa p 98 N83-12751

WIND PROFILES

- The wind characteristics program p 111 N83-15910

WIND SHEAR

- The behavior of LNG vapor clouds Wind-tunnel simulation of 40 M3 LNG spill tests at China Lake Naval Weapons Center, California [PB82-199027] p 12 N83-12665

WIND TUNNEL MODELS

- Investigations of the tornado wind energy system [DE82-017122] p 121 N83-10601

WIND TUNNEL TESTS

- Development of a 5.5 m diameter vertical axis wind turbine, phase 3 [BMFT-FB-T-82-086] p 122 N83-10624
- LNG plume interaction with surface obstacles [PB82-198955] p 12 N83-12666

WIND TURBINES

- Wind turbine blades A study of prototypes in a steady regime - Unsteady considerations [AAAF PAPER NT 81-17] p 113 A83-11777
- A diagnostic model for estimating winds at potential sites for wind turbines p 79 A83-12954
- A review of UK wind energy activities p 114 A83-13650

- The spectrum of wind speed fluctuations encountered by a rotating blade of a wind energy conversion system p 114 A83-13695

- A review of resonance response in large, horizontal-axis wind turbines p 114 A83-13696

- Power augmentation in a Savonius-type wind-turbine by using a single air-deflecting vane p 115 A83-14725

- Characteristics of a Savonius windmill power system with a synchronous generator p 115 A83-15797

- Aerodynamic platform comparison for jet-stream electricity generation p 116 A83-16102

- Mathematical model for the analysis of wind-turbine wakes p 117 A83-16108

- The dynamic inducer as a cost-effective wind turbine system p 118 A83-18457

- Aeroelastic stability analysis of a Darneus wind turbine [DE82-017001] p 121 N83-10603

- Development of a 5.5 m diameter vertical axis wind turbine, phase 3 [BMFT-FB-T-82-086] p 122 N83-10624

- Design and fabrication of composite blades for the Mod-1 wind turbine generator [NASA-CR-167987] p 128 N83-11579

- Aerodynamic research on tipvane wind turbines [VTH-LR-355] p 128 N83-11603

- Wind Energy Conversion Devices [VKI-LS-1981-8] p 130 N83-12526

- General introduction to wind energy conversion [NLR-MP-81014-U] p 130 N83-12527

- Horizontal and vertical axis wind turbines p 130 N83-12529

- Aerodynamic analysis of horizontal axis wind turbines p 130 N83-12530

- Airfoil data for wind turbines p 130 N83-12531

- Control systems for horizontal-axis wind turbines p 130 N83-12532

- Users manual for WIND p 130 N83-12534

- Static and dynamic analysis for hinged rotor blades of 60 m span for a two bladed horizontal axis wind energy converter p 130 N83-12535

- Darneus wind-turbine and pump performance for low-lift irrigation pumping [DE82-016270] p 131 N83-12564

- Safety data for small wind systems [DE82-015400] p 131 N83-12565

- Interaction in limited arrays of windmills [DE82-750056] p 133 N83-13608

- Forced vibration analysis of rotating structures with application to vertical axis wind turbines [DE82-000620] p 133 N83-13625

- Structural-dynamic-response characteristics of Darneus vertical axis wind turbines [DE82-003583] p 135 N83-14545

- The effect of yaw on horizontal axis wind turbine loading and performance [NASA-TM-82778] p 136 N83-14688

- Measured performance of a tip-controlled, teetered rotor with an NACA 64 sub 3-618 tip airfoil [NASA-TM-82870] p 136 N83-14689

- DOE/NASA Lewis large wind turbine program [NASA-TM-82991] p 136 N83-14690

- Operating and maintenance experience with a 6-kW wind energy conversion system at Naval Station, Treasure Island, California [AD-A119389] p 136 N83-14740

WIND VELOCITY MEASUREMENT

- The 17-M VAWT program [DE82-003497] p 137 N83-14756

- Aerodynamics and performance testing of the VAWT [DE82-003574] p 137 N83-14760

- Fifth Biennial Wind Energy Conference and Workshop (WW5) p 146 N83-15908

- The wind characteristics program p 111 N83-15910

- The NASA Lewis large wind turbine program p 146 N83-15911

- Vertical axis wind turbine program p 147 N83-15913

- Operating experience with the 200 kW MOD-OA wind turbine generators p 147 N83-15916

- Operational experience on MP-200 series commercial wind turbine generators p 147 N83-15917

- Test status and experience with the 7.5 megawatt MOD-2 wind turbine cluster p 147 N83-15918

- Conceptual design of the 6 MW MOD-5A wind turbine generator p 147 N83-15919

- Conceptual design of the 7 megawatt MOD-5B wind turbine generator p 147 N83-15920

- Status of the 4 MW WTS-4 wind turbine p 148 N83-15921

- Description of the 3 MW SWT-3 wind turbine at San Geronio Pass California p 74 N83-15922

- DOE/UTRC kW development program p 74 N83-15924

- The 40 kW intermediate SWECS program p 148 N83-15925

- On the power regulation of small wind turbines based on experience with small Danish wind turbines p 148 N83-15926

- Alcoa ALVAWT program p 148 N83-15928

- Measurements on the Magdalen Islands VAWT and future projects p 148 N83-15929

- Review of DAF Indal VAWT commercialization programs p 148 N83-15930

- Status report of the 17-m VAWT program p 148 N83-15931

- Structural dynamic response characteristics of Darneus vertical axis wind turbines p 148 N83-15932

- Aerodynamics and performance testing of the VAWT p 149 N83-15933

- Television interference and acoustic emissions associated with the operation of the Darneus VAWT p 149 N83-15934

- Some innovative concepts in wind turbines of the axial-flow, cross-flow, and combined (dual) flow types p 149 N83-15935

- An update of the electrofluid dynamics wind driven generators p 149 N83-15936

- Recent progress in the development of the Musgrove vertical axis wind turbine p 149 N83-15937

- Atmospheric testing of a two bladed full controlled wind turbine with passive cyclic pitch variation p 149 N83-15938

- Economics of DAWT wind energy systems p 150 N83-15939

- Optimization of the dynamic inducer wind turbine system p 150 N83-15940

- Experiments with a twin rotor, single bladed gyromill p 150 N83-15941

- Vertical-axis wind-turbine program [DE82-003531] p 150 N83-15954

- Power augmentation in a Savonius-type wind-turbine by using a single air-deflecting vane p 115 A83-14725

- The dynamic inducer as a cost-effective wind turbine system p 118 A83-18457

- WIND VELOCITY Generalized characteristics and applicability of various probability distributions for wind energy applications p 112 A83-10654

- The availability of wind energy in Hong Kong p 80 A83-14669

- Characteristics of a Savonius windmill power system with a synchronous generator p 115 A83-15797

- Wind power potential in Belgium [PUBL-SER-B-115] p 86 N83-10563

- Candidate wind-turbine-generator site Data summary [DE82-020416] p 99 N83-12785

- Operating and maintenance experience with a 6-kW wind energy conversion system at Naval Station, Treasure Island, California p 136 N83-14740

- Conceptual design of the 6 MW MOD-5A wind turbine generator p 147 N83-15919

- WIND VELOCITY MEASUREMENT The spectrum of wind speed fluctuations encountered by a rotating blade of a wind energy conversion system p 114 A83-13695

- Simple anemometer for wind classification [BMFT-FB-T-82-106] p 92 N83-10719

- The wind program in a typhoon environment p 148 N83-15927

WINDMILLS (WINDPOWERED MACHINES)

SUBJECT INDEX

WINDMILLS (WINDPOWERED MACHINES)

- A review of UK wind energy activities p 114 A83-13650
- A review of aero-generator fatigue problems p 119 A83-18939
- WECS-load controlled pitch-variable load conversion to heat [DE82-014683] p 121 N83-10602
- Measurement studies of a 15 kW wind power plant — data acquisition and economic evaluation of a 15 kW windmill [BMFT-FB-T-82-109] p 122 N83-10633
- Aerodynamic research on tipvane wind turbines [VTH-LR-355] p 128 N83-11603
- An experimental study of an aerodynamically optimum windmill [NAL-TR-698] p 129 N83-12522
- Interaction in limited arrays of windmills [DE82-750056] p 133 N83-13608
- The wind program in a typhoon environment p 148 N83-15927

WINDPOWER UTILIZATION

- Applications of remote sensing to wind power facility siting p 77 A83-10041
- Generalized characteristics and applicability of various probability distributions for wind energy applications p 112 A83-10654
- Wind power for the electric-utility industry Policy incentives for fuel conservation — Book p 1 A83-11896
- A review of UK wind energy activities p 114 A83-13650
- The availability of wind energy in Hong Kong p 80 A83-14669
- Aerodynamic platform comparison for jet-stream electricity generation p 116 A83-16102
- On the rotary wing concept for jet stream electricity generation p 117 A83-16111
- Heat Transfer and Fluid Mechanics Institute, Meeting, 28th, California State University, Sacramento, CA, June 28, 29, 1982, Proceedings p 37 A83-18451
- An assessment of wind energy resource for northwestern California p 80 A83-18456
- A project for exploitation of a new form of solar energy the wind chill. I - The importance to the energy field II - Application for building heat and electricity production p 38 A83-19238
- Wind power potential in Belgium [PUBL-SER-B-115] p 88 N83-10563
- Investigations of the tornado wind energy system [DE82-017122] p 121 N83-10601
- Technical and economical assessment on Tethered Wind-Energy Systems (TWES) [DE82-017120] p 121 N83-10604
- Test program for wind energy conversion system GROWIAN [BMFT-FB-T-82-072] p 128 N83-11590
- Wind Energy Conversion Devices [VKI-LS-1981-8] p 130 N83-12528
- General introduction to wind energy conversion [NLR-MP-81014-U] p 130 N83-12527
- Site characteristics for wind energy conversion devices p 130 N83-12528
- Horizontal and vertical axis wind turbines p 130 N83-12529
- Users experience in Denmark: Developments, achievements and experience of the Danish activities in wind energy utilization, 1974 - 1981 p 10 N83-12536
- Development of a slide program describing a site selection process for small Wind-Energy-Conversion Systems (SWECS) [DE82-017394] p 99 N83-12788
- Wind-energy program FY 1982 third quarterly review [DE82-019928] p 133 N83-13714
- Structural-dynamic-response characteristics of Darnaus vertical axis wind turbines [DE82-003583] p 135 N83-14545
- DOE/NASA Lewis large wind turbine program [NASA-TM-82991] p 136 N83-14690
- Prospects for foreign applications of wind-energy systems, preliminary report in response to Public Law 95-345 [DE82-007930] p 19 N83-14745
- Aerodynamics and performance testing of the VAWT [DE82-003574] p 137 N83-14760
- Wind power assessment along the Atlantic and Gulf Coasts of the United States p 108 N83-14818
- Fifth Biennial Wind Energy Conference and Workshop (WW5) [DE82-014659] p 146 N83-15908
- The federal wind energy program p 146 N83-15909
- The wind characteristics program p 111 N83-15910
- The USDA agricultural wind energy research program p 147 N83-15914
- The SERI wind energy program p 21 N83-15915

- Agricultural application of SWECS p 111 N83-15923
- The 40 kW intermediate SWECS program p 148 N83-15925
- On the power regulation of small wind turbines based on experience with small Danish wind turbines p 148 N83-15926
- The wind program in a typhoon environment p 148 N83-15927
- Alcoa ALVAWT program p 148 N83-15928
- Measurements on the Magdalen Islands VAWT and future projects p 148 N83-15929
- Review of DAF Indal VAWT commercialization programs p 148 N83-15930
- Status report of the 17-m VAWT program p 148 N83-15931
- Structural dynamic response characteristics of Darnaus vertical axis wind turbines p 148 N83-15932
- Aerodynamics and performance testing of the VAWT p 149 N83-15933
- Vertical-axis wind-turbine program [DE82-003531] p 150 N83-15954

WINDPOWERED GENERATORS

- Characteristics of a Savonius windmill power system with a synchronous generator p 115 A83-15797
- Aerodynamic platform comparison for jet-stream electricity generation p 116 A83-16102
- On the rotary wing concept for jet stream electricity generation p 117 A83-16111
- Transformation of wind energy by a high-altitude power plant p 117 A83-16112
- A review of aero-generator fatigue problems p 119 A83-18939
- Development of a 5.5 m diameter vertical axis wind turbine, phase 3 [BMFT-FB-T-82-086] p 122 N83-10624
- Measurement studies of a 15 kW wind power plant — data acquisition and economic evaluation of a 15 kW windmill [BMFT-FB-T-82-109] p 122 N83-10633
- Test program for wind energy conversion system GROWIAN [BMFT-FB-T-82-072] p 128 N83-11590
- Safety data for small wind systems [DE82-015400] p 131 N83-12565
- Candidate wind-turbine-generator site Data summary [DE82-020416] p 99 N83-12785
- Some methods to connect a windpower induction generator to the utility network [DE82-750057] p 133 N83-13372
- The federal wind energy program p 146 N83-15909
- Rocky Flats small wind systems program An update p 148 N83-15912

WINDPOWERED PUMPS

- Break-in, performance and endurance tests results on fixed displacement hydraulic fluid power vane pumps [AD-A117962] p 128 N83-11504

WIND LOADING

- Aerodynamic research on tipvane wind turbines [VTH-LR-355] p 128 N83-11603

WIRE

- Use of wireline logs at Cerro Prieto in identification of the distribution of hydrothermally altered zones and dike locations and their correlation with reservoir temperatures [DE82-001981] p 107 N83-14661

WOOD

- Kinetics and catalysis of producing synthetic gases from biomass [PB82-214347] p 82 N83-10156
- Gasification kinetics for biomass decomposition [PB82-199043] p 97 N83-12256
- Conversion of forest residues to a methane-rich gas in a high-throughput gasifier [DE82-020289] p 102 N83-13601
- Technical and economic assessment of processes for the production of butanol and acetone [NASA-CR-169623] p 106 N83-14293
- The Tennessee Valley Authority's biomass fuels program [DE81-904161] p 109 N83-15495

WORKING FLUIDS

- The effect of the parameters of metal-fiber capillary structures on the maximum heat-transfer capability of thermal pipes p 156 A83-11515
- Absorption refrigeration machines — Thesis p 156 A83-11525
- An experimental investigation of a stationary reflector/tracking absorber solar collector at intermediate temperatures p 27 A83-13479
- Collection of solar energy at specified output temperature p 28 A83-13582
- An analytical investigation of mass flow, pressure and temperature in a flat-plate solar collector p 37 A83-18452

- Development of geothermal binary-cycle working-fluid properties Information and analysis of cycles [DE82-021542] p 102 N83-13602

X

X RAY DIFFRACTION

- Rapid analysis of mineral content of coal. Development of an on-line monitoring instrument for pyrite and ash in coal p 86 N83-10571

X RAY SPECTRA

- Resistive MHD studies of high-beta Tokamak plasmas [DE82-008101] p 126 N83-10942
- Soft X-ray and VUV emission from REB-heated plasma in REBEX 1 and REBEX 1 machines p 152 N83-16130

X RAYS

- Soft X-ray diagnostics on Tokamak TM-1-MH p 151 N83-16121

XEROGRAPHY

- The residual voltage in fast electrophotography of a-SiH_x/ p 34 A83-15511

Y

YAW

- The effect of yaw on horizontal axis wind turbine loading and performance [NASA-TM-82778] p 136 N83-14688

YIELD

- Fluidized-bed pyrolysis of oil shale Oil yield, composition, and kinetics [DE82-021010] p 97 N83-12571

Z

ZETA PINCH

- Behavior of a plasma in a high-density gas-embedded Z-pinch configuration [DE82-017396] p 125 N83-10935

ZINC COMPOUNDS

- Parametric behavior of the circulating zinc-bromine battery [DE82-001910] p 167 N83-14759

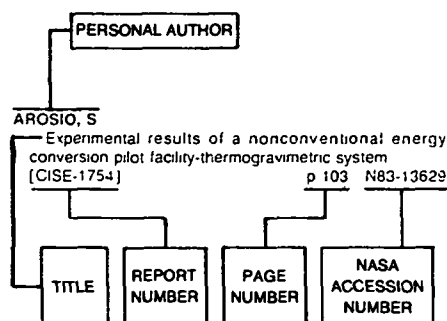
ZINC-BROMIDE BATTERIES

- Development of zinc bromide batteries for stationary energy storage [DE82-018283] p 164 N83-13612

ZIRCONIUM OXIDES

- Theoretical and experimental investigation of high temperature insulators subjected to intense visible radiation [AIAA PAPER 83-0158] p 35 A83-16562

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document cited (e.g., NASA report, translation, NASA contractor report). The page and accession numbers are located beneath and to the right of the title. Under any one author's name the accession numbers are arranged in sequence with the AIAA accession numbers appearing first.

A

- AALDERS, B. G. M.**
Space Telescope Solar panel assembly thermal test analysis p 65 N83-14724
- AAMODT, R. E.**
Instabilities driven by the parallel variation of the electrostatic potential in tandem [DE82-018409] p 126 N83-10941
- ABBEY, K. M.**
Pore size engineering applied to starved electrochemical cells and batteries [NASA-TM-82893] p 119 N83-10134
- ABBEY, O. B.**
Candidate wind-turbine-generator site. Data summary [DE82-020416] p 99 N83-12785
- ABDOU, M. A.**
Methods to enhance blanket power density [DE82-017467] p 127 N83-10958
- ABDURAKHMANOV, A. A.**
Automatic methods for the adjustment of faceted solar-energy concentrators and heliostats p 31 A83-15131
- ABELS, L. L.**
Spectroscopic studies of the hazards of Li/SOCl₂ batteries during anode-limited cell reversal p 114 A83-12056
- ABHAT, A.**
Performance investigation of a long, slender heat pipe for thermal energy storage applications p 159 A83-10651
- ABOO, A.**
Urban waste as a potential source for brick plants p 88 N83-10591
- ABRAHAM, K. M.**
Ambient temperature rechargeable lithium battery [AD-A119297] p 166 N83-14742
- ACTOUKA, M. K.**
Small-scale energy-technology projects in the Pacific Territories. A case-study review [DE82-001338] p 67 N83-14751
- ADAMOWICZ, B.**
Development of the sodium/sulfur batteries, phase 2 [BMFT-FB-T-82-142] p 162 N83-11599

- ADAMS, J. A.**
Study of photovoltaic residential retrofits Volume 1
Executive summary [DE82-015793] p 46 N83-10605
Study of photovoltaic residential retrofits Volume 2
Main report [DE82-015626] p 53 N83-12566
- ADEEB, N.**
Thin film polycrystalline Si p-n junction solar cells with preferential doping p 36 A83-17766
- ADELMAN, M. A.**
Estimation of resource and reserves [PB82-230954] p 103 N83-13631
- ADVANI, G. N.**
Stability of SnO₂ thin films used for photovoltaic devices p 38 A83-18563
- AGNELLO, M.**
Research on the characteristic parameters of thermophotovoltaic /TPV/ converter performance p 24 A83-12029
Evaluation of thermophotovoltaic conversion efficiency p 35 A83-16086
- AHLUWALIA, R. K.**
Coupled three-dimensional flow and electrical calculations for Faraday MHD generators p 117 A83-16107
- AKINS, R. E.**
Gust structure analysis for WECS Design and performance analysis [DE82-005321] p 137 N83-14746
- AKSTINAT, M.**
Improvement of the casing cementation of deep and ultra-deep wells Part 1 Drilling muds and washing fluids [BMFT-FB-T-82-111-PT-1] p 92 N83-11364
Improvement of casing cementation of deep and ultra-deep wells Part 2 Oilfield cements and cement additives [BMFT-FB-T-82-112-PT-2] p 93 N83-11365
- ALI, M. F.**
Remote sensing of coal-fired MHD by optical diagnostic techniques [AIAA PAPER 83-0469] p 80 A83-16736
- ALIEV, S. N.**
Testing of the energy module of a parabolocylindrical solar installation p 31 A83-15130
- ALLEN, H. C.**
Soldered solar arrays p 67 N83-14735
- ALLEN, R. D.**
Aquifer stability investigation [DE82-003831] p 166 N83-14754
- ALLRED, R.**
Analysis of small commercial photovoltaic applications [DE82-020924] p 51 N83-12548
- ANDERSON, A.**
Lithium/sulfur dioxide cell and battery safety [NASA-RP-1099] p 135 N83-14684
- ANDERSON, D. N.**
Catalytic combustion with steam injection [NASA-TM-82923] p 111 N83-15805
- ANDERSON, D. V.**
Analytical and numerical calculations of field-reversed Theta-pinch equilibria based on a generalized Hill's vortex model [DE82-003150] p 139 N83-15139
- ANDERSON, L. M.**
Solar energy conversion using surface plasmons for broadband energy transport p 69 N83-15815
- ANDERSON, S. H.**
Thermal energy storage testing facilities [DE82-000110] p 168 N83-15948
- ANDERSON, W. W.**
Field ionization of deep levels in semiconductors with applications to Hg/1-x/Cd/x/ Te p-n junctions p 156 A83-16089
- ANDRETTA, A.**
Global solar radiation estimation from relative sunshine hours in Italy p 26 A83-12951
- ANGELINO, G.**
Test results of a medium temperature solar engine p 115 A83-16000

- ANNUSHKIN, I. U. M.**
An experimental study of fuel combustion in a high-temperature air counterflow p 79 A83-14056
- ANSON, B.**
Garrett solar Brayton engine/generator status p 44 N83-10545
- ANSON, D.**
Potential for use of peat blends with coal for electric power generation [DE82-003634] p 110 N83-15497
- ANSPAUGH, B. E.**
Solar cell radiation handbook [NASA-CR-169662] p 61 N83-14687
- ANTHONY, A. M.**
Production of hydrogen by direct thermal decomposition of water - Preliminary investigations p 75 A83-16042
- ANTONELLI, M.**
Automotive Stirling engine development program [NASA-CR-167907-2] p 140 N83-15176
Automotive Stirling engine development program [NASA-CR-167907-1] p 140 N83-15177
- APPLE, C.**
Mechanisms of dry SO₂ control processes [PB82-196924] p 12 N83-12668
- ARAUJO, G. L.**
A new method for experimental determination of the series resistance of a solar cell p 30 A83-14512
- ARENS, K. H.**
Improvement of the casing cementation of deep and ultra-deep wells Part 1 Drilling muds and washing fluids [BMFT-FB-T-82-111-PT-1] p 92 N83-11364
Improvement of casing cementation of deep and ultra-deep wells Part 2 Oilfield cements and cement additives [BMFT-FB-T-82-112-PT-2] p 93 N83-11365
- ARGYRIS, J. H.**
Static and dynamic analysis for hinged rotor blades of 60 m span for a two bladed horizontal axis wind energy converter p 130 N83-12535
- ARONOFF, S.**
Environmental monitoring of the Athabasca Oil Sands using Landsat data p 79 A83-11988
Environmental monitoring of the Athabasca Oil Sands Region p 80 A83-14238
- AROSIO, S.**
Experimental results of a nonconventional energy conversion pilot facility-thermogravimetric system [CISE-1754] p 103 N83-13629
- ARTBAUER, J.**
Flexible gas insulated cable for high power transmission [BMFT-FB-T-82-099] p 158 N83-10370
- ARTHUR, C. A.**
Lawrence Berkeley Laboratory neutral-beam engineering test facility power-supply system [DE82-003044] p 137 N83-15104
- ARVIDSON, A.**
Development of a polysilicon process based on chemical vapor deposition, phase 1 [NASA-CR-169633] p 59 N83-14673
- ASH, M. C.**
On the open-circuit voltage of a Schottky-barrier MIS solar cell p 36 A83-17770
- ASMUSSEN, J.**
Measurements of energy distribution and thrust for microwave plasma coupling of electrical energy to hydrogen for propulsion [AIAA PAPER 82-1951] p 75 A83-12508
- ASNANI, G. C.**
The climate of Africa, including feasibility study of climate alert system p 170 N83-12737
- ASO, S.**
TI-59 program for calculating the annual energy requirements for residential heating and cooling Volume 1 Users manual [DE82-010174] p 13 N83-13594
- ASSANIS, D.**
Preliminary analysis of wave energy conversion at an offshore structure [AD-A120079] p 146 N83-15903

ASTER, R. W.

Project analysis and integration area p 41 N83-10524

ATTENBERGER, S. E.

Fusion reactor plasma-performance modeling
POPICON analysis p 126 N83-10943
Computational methods in Tokamak transport
[DE82-016616] p 132 N83-13006

ATTIA, A.

Development of zinc bromide batteries for stationary
energy storage
[DE82-019283] p 164 N83-13612

AUDIBERT, M.

The French thermo-helio-electricity-KW parabolic dish
program p 44 N83-10542

AUGUSTINE, F., JR.

Neutron attenuation in the laser ducts of an
inertial-confinement fusion reactor
[DE82-007195] p 126 N83-10947

AURIAN-BLAJENI, B.

Polycrystalline lanthanum rhodate and lutetium rhodate
photoelectrodes for liquid junction solar cells
p 33 A83-15480

AUSTIN, L. G.

Expansion of coal-preparation-plant simulator
[DE82-001576] p 106 N83-14301

AUTHIER, B.

Reflections on solar collectors at elevated temperatures
/260-1000 C/ p 23 A83-11766
Axisymmetric reflectors of the stepped spherical type
p 38 A83-19194

AVERY, J. W.

Ambient temperature rechargeable lithium battery
[AD-A119297] p 166 N83-14742

AWAY, H.

Configuration selection study for isolated loads using
parabolic dish modules p 45 N83-10548

AXELL, R. A.

Test status and experience with the 7.5 megawatt
MOD-2 wind turbine cluster p 147 N83-15918

AYERS, D. J.

Investigation of the performance of a Ford 4 1 L 6
cylinder SI engine operating on methanol iso-butanol
gasoline fuel blends
[AD-A117746] p 84 N83-10426

B

BABICKY, V.

Apparatus for plasma electron temperature and density
measurements by Thomson scattering p 153 N83-16134

BACCELLI, E.

Electric-utility solar-energy activities 1981 survey
[DE82-905804] p 57 N83-13623

BACHMAN, A. L.

The development of a geopressed energy
management information system in support of research
planning, phase 1
[PB82-207366] p 91 N83-10638

BADER, B. E.

Oil-shale program
[DE82-900588] p 111 N83-15951

BAILEY, C. E.

Parametric study of geohydrologic performance
characteristics for nuclear-waste repositories
[DE82-003145] p 17 N83-13973

BAKER, B.

Internal reforming for natural gas fueled molten
carbonate fuel cells
[PB82-200676] p 128 N83-11607

BAKER, C. C.

Wildcat A catalyzed D-D Tokamak reactor
[DE82-013712] p 125 N83-10938

BAKER, D. A.

Equilibrium poloidal field distributions in
reversed-field-pinch toroidal discharges
[DE82-014130] p 134 N83-13996

BAKER, G. G.

Liquefaction behavior of an Australian brown coal in
comparison to that of two US lignites
[DE82-021977] p 95 N83-12201

BALDI, R. W.

Utilizing subcooled, superfluid He-II in the design of a
12-Tesla tandem-mirror experiment p 138 N83-15133

BALDWIN, D. H.

The NASA Lewis large wind turbine program
p 146 N83-15911

BALDY, C.

Study of ground winds in Upper Volta Economic and
agronomic consequences for the Sudan-Sahel region of
west Africa p 98 N83-12751

BALESTRI, M.

Experimental results of a nonconventional energy
conversion pilot facility-thermogravimetric system
[CISE-1754] p 103 N83-13629

BANERJEE, H. D.

Large grain polycrystalline silicon from rice husk
p 33 A83-15492

BANGERTER, C. D.

Self-excited MHD power source for space applications
p 141 N83-15849

BANGERTER, R. O.

Heavy-ion inertial fusion Initial survey of target gain
versus ion-beam parameters
[DE82-003069] p 138 N83-15117

BANKS, B.

Growth of diamondlike films for power applications
p 170 N83-15880

BANKS, D.

An efficient fully implicit simulator
[CSS-126] p 109 N83-15322

BARANOV, V. K.

Automatic methods for the adjustment of faceted
solar-energy concentrators and heliostats
p 31 A83-15131

BARAONA, C. R.

Evaluation of electrode shape and nondestructive
evaluation method for welded solar cell interconnects
[NASA-TM-82966] p 45 N83-10555

BARBER, R. E.

Microstructural analysis of solar cell welds
p 72 N83-15833
Evaluation of solar cell welds by scanning acoustic
microscopy p 72 N83-15834

BARBER, R. E.

Organic Rankine power conversion subsystem
development for the small community solar thermal power
system p 43 N83-10533

BARCLAY, J. A.

Superconducting-transmission-line project at the Los
Alamos National Laboratory
[DE82-021835] p 158 N83-12344

BARKER, S. N.

Fluidised-bed combustion Combustion of run-of-mine
coal in a 12-inch-diameter pressurized fluidised-bed
combustor
[DE82-018786] p 95 N83-12204

BARNES, D. C.

Analytical and numerical calculations of field-reversed
Theta-pinch equilibria based on a generalized Hill's vortex
model
[DE82-003150] p 139 N83-15139

BARNES, K. A.

Ion kinetic effects on the tilt mode in FRCs
[DE82-002329] p 155 N83-16227

BARNES, K. A.

Comparative analysis of economic models in selected
solar energy computer programs
[PB82-184995] p 55 N83-12589

BARNETT, J. P.

Ti-59 program for calculating the annual energy
requirements for residential heating and cooling Volume
2 Program reference manual p 13 N83-13595

BARONA, C. R.

Large area low-cost space solar cell development
p 62 N83-14699

BARR, W. L.

Feasibility study of a fission-suppressed tandem-mirror
hybrid reactor
[DE82-019375] p 134 N83-13997

BARRATT, A. J.

Designs of tandem-mirror fusion reactors
[DE82-000845] p 138 N83-15134

BARRATT, A. J.

Experiments with a twin rotor, single bladed gyromill
p 150 N83-15941

BARRETT, W. J.

Sampling for high-molecular-weight organic compounds
in power plant stack gases
[PB82-234618] p 16 N83-13659

BARROWS, R. D.

Kinetics and catalysis of producing synthetic gases from
biomass
[PB82-214347] p 82 N83-10156

BARTOLI, B.

Global solar radiation estimation from relative sunshine
hours in Italy p 26 A83-12951

BARTON, R. S.

Conceptual design of the 6 MW MOD-5A wind turbine
generator p 147 N83-15919

BARUTTI, A.

Test results of a medium temperature solar engine
p 115 A83-16000

BASIN, S. L.

Computer-simulation code for the prediction of reliability
and available capacity of modular energy-storage arrays
Volume 1 Overview
[DE82-906445] p 164 N83-13618

BASIULIS, A.

Radiant heating tests of several liquid metal heat-pipe
sandwich panels
[AIAA PAPER 83-0319] p 157 A83-16649

BASS, L.

Safety data for small wind systems
[DE82-015400] p 131 N83-12565

BASTARD, J. L.

TV-SAT solar array p 64 N83-14714

BATCHELDER, J. S.

The luminescent solar concentrator p 48 N83-10902

BATES, S. C.

Fusion Energy Division automation of the ISX-B neutral
beams
[DE82-016369] p 132 N83-13008

BATESOLE, W. R.

Design and fabrication of composite blades for the
Mod-1 wind turbine generator
[NASA-CR-167987] p 128 N83-11579

BATHEY, B. R.

Review - Solar-grade silicon p 29 A83-13677

BATHKE, C. G.

Parametric systems analysis of the Modular Stellarator
Reactor (MSR)
[DE82-016244] p 126 N83-10945

BAUDER, H. J.

Air circuit with heat pump
[PB82-221219] p 18 N83-14312

BAUER, J. V.

Catalyst and reactor development for a liquid-phase
Fischer-Tropsch process
[DE82-003369] p 105 N83-14207

BAUER, R.

Development of the sodium/sulfur batteries, phase 2
[BMFT-FB-T-82-142] p 162 N83-11599

BAUM, B.

Investigation of test methods, material properties and
processes for solar cell encapsulants
[NASA-CR-169636] p 60 N83-14676

BAUMAN, L. E.

Remote sensing of coal-fired MHD by optical diagnostic
techniques
[AIAA PAPER 83-0469] p 80 A83-16736

BAUMARD, J. F.

Production of hydrogen by direct thermal decomposition
of water - Preliminary investigations p 75 A83-16042

BAUR, G.

Solar energy conversion based on the principle of
fluorescent collectors
[BMFT-FB-T-82-081] p 47 N83-10621

BAXTER, R. A.

Southern California offshore air quality model validation
study Volume 1 Executive summary
[PB82-190711] p 9 N83-11631

Southern California offshore air quality model validation
study Volume 2 Synthesis of findings
[PB82-190729] p 9 N83-11632

BAYLOR, V. B.

Stress-corrosion studies in coal-liquefaction
environments
[DE82-001464] p 100 N83-13240

BEBERMEIER, H.

Corrosion in fractionation systems
[DE82-001441] p 109 N83-15427

BECKER, J. D.

Low Earth orbit blanket technologies for the power range
of 15-60 kW p 61 N83-14696

BECKER, N. M.

A multi-site magnetotelluric measurement system with
real-time data analysis
[DE82-020596] p 98 N83-12704

BECKMANN, F.

Power from the hot-dry-rock geothermal resource
[DE82-000759] p 107 N83-14750

BECKMANN, F.

Utilization of ANCIT plant by-products
[BMFT-FB-T-82-144] p 94 N83-11600

BECKWITH, M. A.

Environmental and regulatory aspects of compressed-air
energy storage
[DE82-003868] p 19 N83-14757

BEDARD, R.

Acurex Parabolic Dish Concentrator (PDC-2)
p 42 N83-10527

BEEBE, K. W.

Evaluation of advanced combustion concepts for dry
NO sub x suppression with coal-derived, gaseous fuels
[NASA-TM-82985] p 85 N83-10557

BEEBE, G. I. M.

Space Telescope Solar panel assembly thermal test
analysis p 65 N83-14724

BEHRENDORFF, M. J.

Transient performance of evacuated tubular solar
collectors p 27 A83-13478

- BEHRENS, G.**
Analytical prediction of the dynamic in-orbit behavior of large flexible solar arrays p 65 N83-14723
- BEHRENS, G. P.**
Impact of NOx selective catalytic reduction processes on flue gas cleaning systems [PB82-240086] p 16 N83-13664
- BEHRET, H.**
Thermochemical heat storage State-of-the-art report [PB82-188087] p 162 N83-11610
- BEKEFI, G.**
Lower hybrid RF current drive and electron-cyclotron heating on the Versator 2 Tokamak [DE82-017127] p 125 N83-10934
Observation of the parametric decay instability during electron cyclotron resonance heating on the Versator 2 Tokamak [DE82-012573] p 125 N83-10939
Second-cyclotron-harmonic emission measurements on ISX-B [DE82-009938] p 126 N83-10949
- BELENCAN, H.**
Conversion of municipal solid waste to energy, Jacksonville, Florida p 5 N83-10593
- BELL, E. J.**
Low- to moderate-temperature geothermal resource assessment for Nevada Area specific studies, Pumpernickel Valley, Carlin and Moana [DE82-018598] p 98 N83-12584
- BELLECCI, C.**
A parametric analysis of the performances of a linear collectors' network of a solar power plant p 36 A83-18139
- BELLES, F. E.**
Commercialization of a pulse combustion furnace with ultrahigh efficiency [PB82-243809] p 12 N83-13217
- BELLOWS, R.**
Parametric behavior of the circulating zinc-bromine battery [DE82-001910] p 167 N83-14759
- BENILOV, M. S.**
Computational model of a diffuse discharge on electrodes in a weakly ionized plasma p 114 A83-11952
- BERNARD, J.**
The reduction of radiation damage in solar cells A study of radiation defects in silicon, first phase [CESR-81-985] p 57 N83-13626
The reduction of radiation damage in space solar cells A study of radiation defects in silicon (+) p 63 N83-14710
- BERNARD, M. J.**
Vehicle characterization for the TAPCUT Project Performance and cost [DE82-019772] p 13 N83-13465
- BERNDT, E. R.**
A review of the Energy Productivity Center's least cost energy strategy study [PB82-188111] p 11 N83-12591
- BERS, A.**
Radial effects in heating and thermal stability of a sub-ignited Tokamak [DE82-009384] p 124 N83-10932
Antenna-plasma coupling theory for ICRF heating of large tokamaks [DE82-013226] p 125 N83-10933
- BESSEY, J. S.**
Textured solar cell covers for light weight and high performance p 66 N83-14728
- BHUMRAKAR, C. M.**
A diagnostic model for estimating winds at potential sites for wind turbines p 79 A83-12954
- BICKLER, D. B.**
Cell and module formation research area p 41 N83-10522
- BIEDINGER, J.-M.**
On the optimization of magnetic field sources in electromechanical energy conversion p 112 A83-10641
- BIELLE-DASPET, D.**
The reduction of radiation damage in solar cells A study of radiation defects in silicon, first phase [CESR-81-985] p 57 N83-13626
The reduction of radiation damage in space solar cells A study of radiation defects in silicon (+) p 63 N83-14710
- BIGGS, D. L.**
Ashing properties of coal blends p 86 N83-10572
- BILGEN, C.**
Hydrogen as a vector for central receiver solar utilities p 75 A83-16044
- BILGEN, E.**
Hydrogen as a vector for central receiver solar utilities p 75 A83-16044
- BILSON, E.**
Studies related to the deep earth gas [PB82-227653] p 84 N83-10213
- BIRCHENOUGH, A. G.**
Operating experience with the 200 kW MOD-OA wind turbine generators p 147 N83-15916
- BIRD, S. P.**
Evaluation of solar-air-heating central-receiver concepts [DE82-016924] p 48 N83-11586
- BIRLINGMAIR, D.**
Coal preparation and testing p 86 N83-10573
Performance characteristics of heavy media cyclones using fly ash-derived heavy media p 86 N83-10574
- BISHOP, M. O.**
Fluidized-bed pyrolysis of oil shale Oil yield, composition, and kinetics [DE82-021010] p 97 N83-12571
- BLACKLER, J.**
Experiments with a twin rotor, single bladed gyromill p 150 N83-15941
- BLAIR, L. S.**
Laser-isotope-separation technology [DE81-030114] p 104 N83-14197
- BLAKE, C. L.**
The impact of petroleum, synthetic and cryogenic fuels on civil aviation [FAA-EM-82-29] p 106 N83-14291
- BLANKENSHIP, C. P.**
Materials technology for large space structures p 171 N83-15882
- BLANTON, J. C.**
Evaluation of catalytic combustion of actual coal-derived gas [NASA-CR-167842] p 102 N83-13588
- BLEVINS, R. P.**
The 1980 survey and evaluation of utility conservation, load management, and solar end-use projects Volume 3 Utility load management project [DE82-007247] p 10 N83-12559
- BLOEDORN, J.**
Safety data for small wind systems [DE82-015400] p 131 N83-12565
- BOBBETT, R. E.**
Application of fuel cells to highway and nonhighway transportation [DE82-004365] p 156 N83-16259
- BODA, F. P.**
Organic Rankine power conversion subsystem development for the small community solar thermal power system p 43 N83-10533
- BOENIG, H. J.**
Design and testing of a 13.75 MW converter for a superconducting magnetic-energy-storage system [DE82-002385] p 166 N83-14749
- BOGHOSIAN, B. M.**
Designs of tandem-mirror fusion reactors [DE82-000845] p 138 N83-15134
- BOHN, M.**
Scatterplate flux mapping for solar concentrators [DE82-021359] p 54 N83-12588
- BOHN, T. S.**
Methods to enhance blanket power density [DE82-017467] p 127 N83-10958
- BONANNO, A.**
A parametric analysis of the performances of a linear collectors' network of a solar power plant p 36 A83-18139
- BONFANTI, F.**
Experimental results of a nonconventional energy conversion pilot facility-thermogravimetric system [CISE-1754] p 103 N83-13629
- BONNET, D.**
Research and development on a MIS thin film solar cell made of amorphous silicon [BMFT-FB-T-82-079] p 47 N83-10620
- BONNOT, P.**
Large infrared test rig for vacuum temperature cycling tests in the ESTEC DTC p 65 N83-14720
- BONOLI, P. I.**
Lower hybrid RF current drive and electron-cyclotron heating on the Versator 2 Tokamak [DE82-017127] p 125 N83-10934
- BORDEN, P. G.**
Progress toward cascade cells made by OM-VPE p 69 N83-15813
- BORENGASSER, M.**
Exploration for fractured petroleum reservoirs using radar/Landsat merge combinations p 77 A83-10031
- BORGHI, C. A.**
Effect of radiation and non-Maxwellian electron distribution on relaxation processes in an atmospheric cesium seeded argon plasma [EUT-82-E-124] p 140 N83-15144
- BORMAN, G. L.**
Alcohol as a fuel for farm and construction equipment [DE82-021022] p 100 N83-13277
Diesel combustion analysis using rapid sampling techniques [AD-A119658] p 104 N83-14192
- BORRERO, J. M.**
Diffused P+-N solar cells in bulk GaAs p 69 N83-15818
- BORTON, D. N.**
PKI solar thermal plant evaluation at Capitol Concrete Products, Topeka, Kansas p 43 N83-10535
- BORUCKI, W. J.**
The satellite power system - Assessment of the environmental impact on middle atmosphere composition and on climate p 2 A83-14517
- BOSE, D. N.**
Large grain polycrystalline silicon from rice husk p 33 A83-15492
- BOSTICK, F. X.**
A multi-site magnetotelluric measurement system with real-time data analysis [DE82-020596] p 98 N83-12704
- BOTTENBERG, W. R.**
A manufacturer's perspective of measurement equipment needs for the photovoltaics industry p 32 A83-15454
- BOTTS, T. E.**
Compact, high-power nuclear reactor systems based on small diameter particulate fuel p 143 N83-15859
- BOUDREAU, R. A.**
Influence of deposition rate on the character of electrodeposited CdSe used for photoelectrochemical cells p 34 A83-15499
- BOURGAIN, J.**
The reduction of radiation damage in solar cells A study of radiation defects in silicon, first phase [CESR-81-985] p 57 N83-13626
The reduction of radiation damage in space solar cells A study of radiation defects in silicon (+) p 63 N83-14710
- BOWDEN, J. N.**
Tests of blending and correlation of distillate fuel properties p 78 A83-11050
- BOWMAN, M. G.**
Use of oxide decompositions in advanced thermochemical hydrogen cycles for solar heat sources Experimental results on the low-temperature reactions for the trisulfate tetraoxide-cobalt monoxide pair [DE82-002390] p 77 N83-15958
- BOWYER, J.**
Configuration selection study for isolated loads using parabolic dish modules p 45 N83-10548
- BOYER, W. B.**
Pulsed power for inertial-confinement fusion [DE82-001991] p 137 N83-15116
- BRAASCH, R. H.**
Vertical axis wind turbine program p 147 N83-15913
Vertical-axis wind-turbine program [DE82-003531] p 150 N83-15954
- BRADLEY, R. A.**
Corrosion in fractionation systems [DE82-001441] p 109 N83-15427
- BRAINARD, W. A.**
The worldwide market for photovoltaics in the rural sector [NASA-TM-83035] p 73 N83-15840
- BRANDELL, L.**
Some comments on the World Energy Conference (WEC) energy demand model [USIP-82-04] p 15 N83-13628
- BRANDHORST, H. W.**
On the cause of the flat-spot phenomenon observed in silicon solar cells at low temperatures and low intensities p 63 N83-14705
Effects of processing and dopant on radiation damage removal in silicon solar cells p 63 N83-14708
- BRANDHORST, H. W., JR.**
Radiation damage in front and back illuminated high resistivity silicon solar cells [NASA-TM-82965] p 48 N83-10962
- BRATIN, P.**
Transport properties of Nafion membranes for use in three-electrode photoelectrochemical storage cells p 160 A83-12055
- BRAUN, K. A.**
Static and dynamic analysis for hinged rotor blades of 60 m span for a two bladed horizontal axis wind energy converter p 130 N83-12535
- BRAZELL, R. S.**
Analysis of treated sludges and associated leachates from coal-conversion facilities [DE82-001488] p 103 N83-13650

BREGOLI, L. J.

The effect of thickness on the performance of molten carbonate fuel cell cathodes p 115 A83-15869

BREIDUNG, P.

Pressure-swinging underground gasification
Theoretical and experimental investigations of gasification,
phase 2 [BMFT-FB-T-82-066] p 89 N83-10615

BREMER, J. C.

General contamination criteria for optical surfaces
p 29 A83-13743

BREYMAYER, W.

Utilization of the waste heat of a steel work
[BMFT-FB-T-82-135] p 8 N83-11597

BRIAN, B. W.

Catalyst and reactor development for a liquid-phase
Fischer-Tropsch process [DE82-003369] p 105 N83-14207

BRINKEN, K.

Development, construction, and experimental operation
of an improved chainless haulage system for drum-shearer
loaders [BMFT-FB-T-82-102] p 158 N83-10428

BRINKER, C. J.

Sol-gel protective coatings for black chrome solar
selective films [DE82-004138] p 74 N83-15942

BRINKER, D. J.

Radiation damage and annealing in large area n+/p/p+
GaAs shallow homojunction solar cells p 71 N83-15826

BRINKMANN, P. W.

Large infrared test rig for vacuum temperature cycling
tests in the ESTEC DTC p 65 N83-14720

BRITT, E. J.

Effects of reactor design, component characteristics and
operating temperatures on direct conversion power
systems p 142 N83-15857
Status of thermoelectronic laser energy conversion,
TELEC p 143 N83-15864

BRODER, J. D.

On the cause of the flat-spot phenomenon observed
in silicon solar cells at low temperatures and low
intensities p 63 N83-14705

BROOKS, J. N.

Wildcat A catalyzed D-D Tokamak reactor
[DE82-013712] p 125 N83-10938

BROUKHIYAN, E. M. H.

Fumigation of alcohol in a light duty automotive diesel
engine [NASA-CR-167915] p 100 N83-13272

BROWN, D. K.

Analysis of treated sludges and associated leachates
from coal-conversion facilities [DE82-001488] p 103 N83-13650

BROWN, D. R.

Evaluation of solar-air-heating central-receiver
concepts [DE82-016924] p 48 N83-11586

BROWN, R. A.

Chemical sources Battery p 140 N83-15844

BRUGGER, H.

Air circuit with heat pump [PB82-221219] p 18 N83-14312

BRUGHERA, P.

On the properties of the superplastic aluminum-calcium
alloy as material for solar collectors p 34 A83-15496

BRUNSMANN, U.

Research and development on a MIS thin film solar cell
made of amorphous silicon [BMFT-FB-T-82-079] p 47 N83-10620

BUBE, R. H.

Transport mechanisms for Mg/Zn3P2 junctions
p 35 A83-16071

BUCH, W.

Fundamental research into high voltages for further
development of electric power distribution systems
[BMFT-FB-T-82-064] p 157 N83-10368

BUCHER, E.

Investigation of new solar cells Part A Novel
semiconductors and their suitability Part B Polycrystalline
MIS diodes [BMFT-FB-T-82-103] p 48 N83-10632

BUCK, J. W.

Candidate wind-turbine-generator site Data summary
[DE82-020416] p 99 N83-12785

BUDEN, D.

Overview of space reactors p 142 N83-15855

BUESCH, S. C.

Research, development and demonstration in the design
of sanitary landfill to optimize the generation and capture
of compressible gas p 89 N83-10595

BULLOCK, C. E.

Northern-climate heat-pump field performance
evaluation [DE82-905832] p 12 N83-13402

BUNDSCHUH, V.

Prototype solar house Study of the scientific evaluation
and feasibility of a research and development project
[BMFT-FB-T-82-137] p 49 N83-11598

BURKE, W. R.

Photovoltaic Generators in Space
[ESA-SP-173] p 61 N83-14694

BURNHAM, A. K.

Reaction kinetics and diagnostics for oil-shale
retorting [DE82-001598] p 112 N83-15952

BURNS, D.

Internal reforming for natural gas fueled molten
carbonate fuel cells [PB82-200676] p 128 N83-11607

BURRIS, R. D.

CAMAC based inter-computer communications system
[DE82-002879] p 156 N83-16233

BUSSOLARI, R. J.

Status of the 4 MW WTS-4 wind turbine
p 148 N83-15921

BUTLER, R. J.

Projected temperature dependence of quantum yields
for photoreactions involving energy or electron transfer
p 37 A83-18559

BYKOWSKI, B. B.

Characterization of diesel emissions from operation of
a light-duty diesel vehicle on alternate source diesel
fuels [PB82-232448] p 101 N83-13281

Characterization of diesel emissions from operation of
a light-duty diesel vehicle on alternate source diesel
fuels [PB82-234147] p 101 N83-13282

BYVIK, C. E.

Layered transition metal thiophosphates /MPX3/ as
photoelectrodes in photoelectrochemical cells
p 33 A83-15483

C**CABESTANY, J.**

Nonlinear algorithms application to irradiated solar cell
parameters evaluation p 62 N83-14700

CABRAAL, A.

Market assessment of photovoltaic power systems for
agricultural applications worldwide [NASA-CR-165541] p 56 N83-13585

CAIRELLI, J. E.

Assessment of alternative power sources for mobile
mining machinery [NASA-TM-82695] p 136 N83-14691

CALES, B.

Production of hydrogen by direct thermal decomposition
of water - Preliminary investigations p 75 A83-16042

CALLAGHAN, W. T.

FSAs future role p 39 N83-10507

CALLEN, J. D.

Rippling modes in the edge of a Tokamak plasma
[DE82-007724] p 125 N83-10940

CAMARCA, M.

A parametric analysis of the performances of a linear
collectors' network of a solar power plant p 36 A83-18139

CAMARDA, C. J.

Radiant heating tests of several liquid metal heat-pipe
sandwich panels [AIAA PAPER 83-0319] p 157 A83-16649

CAMPBELL, J.

Investigation of engineering and design considerations
in selecting conveyors for densified Refuse-Derived Fuel
(dRDF) and dRDF Coal mixtures [AD-A119065] p 107 N83-14495

CANDEA, R. M.

Polycrystalline p-WSe2 as photocathode in an
electrochemical solar cell p 29 A83-13702

CANFIELD, D.

Electrochemical storage cell based on polycrystalline
silicon [DE82-020595] p 56 N83-13600

CAPE, J. A.

Efficiency-improvement study for GaAs solar cells
[DE82-016410] p 48 N83-11585

CAPONE, L. A.

The satellite power system - Assessment of the
environmental impact on middle atmosphere composition
and on climate p 2 A83-14517

CARIFI, N.

The experience collected in the management of the
Centro Informazioni Studi Esperienze (CISE) radioactive
waste from 1960 to 1980 [CISE-1738] p 17 N83-13977

CARIOU, J. M.

Transport of solar energy with optical fibres
p 29 A83-13698

CARL, D. E.

NOx results from two combustors tested on medium
BTU coal gas p 78 A83-11493

CARLISLE, D.

Geochemical studies of cores from the San Juan Basin
Research Site, Grants Uranium Region, New Mexico
[DE82-004153] p 108 N83-14795

CARLSON, G. A.

Designs of tandem-mirror fusion reactors
[DE82-000845] p 138 N83-15134

CARLSSON, O.

Some methods to connect a windpower induction
generator to the utility network [DE82-750057] p 133 N83-13372

CARMICHAEL, A. D.

Preliminary analysis of wave energy conversion at an
offshore structure [AD-A120079] p 146 N83-15903

CARRERAS, B. A.

Rippling modes in the edge of a Tokamak plasma
[DE82-007724] p 125 N83-10940
Resistive MHD studies of high-beta Tokamak plasmas
[DE82-008101] p 126 N83-10942
Resistive MHD studies of high-beta-Tokamak plasmas
[DE82-001478] p 139 N83-15141

CARTER, J. R., JR.

Solar cell radiation handbook
[NASA-CR-169662] p 61 N83-14687

CASASSA, E. Z.

Program of basic research on the utilization of coal-water
mixture fuels [DE82-002232] p 106 N83-14299

CASE, C. W.

Small-scale energy-technology projects in the Pacific
Territories A case-study review [DE82-001338] p 67 N83-14751

CASE, P.

Development of criteria for extension of applicability of
low-emission, high-efficiency coal burners
[PB82-197153] p 93 N83-11377

CASTAGNO, G.

Research on the characteristic parameters of
thermophotovoltaic /TPV/ converter performance
p 24 A83-12029

CASTANER-MUNOZ, L.

The reduction of radiation damage in space solar cells
A study of radiation defects in silicon (+) p 63 N83-14710

CASTANER, L.

Nonlinear algorithms application to irradiated solar cell
parameters evaluation p 62 N83-14700

CASTEL, E. D.

Use of test structures in the production of CdS/Cu2S
photovoltaic devices p 32 A83-15455

CATTO, P. J.

Instabilities driven by the parallel variation of the
electrostatic potential in tandems [DE82-018409] p 126 N83-10941
Reduction of neoclassical losses in
magnetic-confinement devices [DE82-020277] p 132 N83-13003
Radial gliding-center drifts and omnigenity in
bumpy-torus confinement systems [DE82-019802] p 135 N83-14000

CHAI, A. T.

Solar cell having improved back surface reflector
[NASA-CASE-LEW-13620-1] p 55 N83-13579

CHAKALEV, K. N.

Thermal energy storage units for solar electric power
plants p 31 A83-15132

CHALMERS, B. B.

Study of photovoltaic residential retrofits Volume 1
Executive summary [DE82-015793] p 46 N83-10605

Study of photovoltaic residential retrofits Volume 2
Main report [DE82-015626] p 53 N83-12566

CHAMPION, R. L.

Development effort of Sheet Molding Compound (SMC)
parabolic trough panels [DE82-000841] p 67 N83-14761

CHAN, R. K. C.

Computer modeling of mixing and agglomeration in
coal-conversion reactors Volume 1 Model formulation
[DE82-014836] p 84 N83-10212

CHANG, D.

Study of ion beam-initiated inertial-confinement fusion
[DE82-013935] p 124 N83-10931

CHAPMAN, G. T.

ORNL integral experiment to provide data for evaluating
magnetic-fusion-energy shielding concepts Part 1
Attenuation measurements [DE82-019775] p 135 N83-13999

- CHAPMAN, R.**
Measurements of energy distribution and thrust for microwave plasma coupling of electrical energy to hydrogen for propulsion
[AIAA PAPER 82-1951] p 75 A83-12508
- CHARAGUNDLA, S. R.**
A laboratory approach to obtain suspension combustion data for reuse derived fuels p 87 N83-10579
- CHARKEY, A.**
Development of a high-rate insoluble zinc electrode for alkaline batteries
[DE82-020608] p 162 N83-12572
- CHATURVEDI, S. K.**
Analysis of two-phase flow solar collectors with application to heat pumps p 27 A83-13481
- CHEN, B. S.**
Multivariable stability-margin optimisation with decoupling and output regulation p 2 A83-16191
- CHEN, H. S.**
A conceptual study of the potential for automotive-derived and free-piston Stirling engines in 30- to 400-kilowatt stationary power applications
[NASA-CR-165274] p 121 N83-10568
- CHEN, J.**
Alcohol as a fuel for farm and construction equipment
[DE82-021022] p 100 N83-13277
- CHEN, J. S.**
Microbiological studies towards optimization of methane from manne plant biomass
[PB82-214362] p 92 N83-10756
- CHEN, K. I.**
Lower hybrid RF current drive and electron-cyclotron heating on the Versator 2 Tokamak
[DE82-017127] p 125 N83-10934
- CHEN, K. S.**
Investigation of free-forced convection flows in cavity-type receivers
[DE82-020118] p 49 N83-12386
- CHEN, M. M.**
Development of enhanced heat transfer/transport/storage sturnes for thermal-system improvement
[DE82-021236] p 158 N83-12387
- CHEN, R. T.**
Advances in large-diameter liquid encapsulated Czochralski GaAs p 70 N83-15819
- CHEN, S.**
Development of criteria for extension of applicability of low-emission, high-efficiency coal burners
[PB82-197153] p 93 N83-11377
- CHEN, S.-Y.**
Momentum theory, dynamic inflow, and the vortex-ring state p 116 A83-16026
- CHEN, Y.-Q.**
The influence of the interface state on the properties of solar cell semiconductor electrodes p 26 A83-13473
- CHENEY, M. C.**
DOE/UTRC kW development program p 74 N83-15924
- CHENG, C. Z.**
High-n collisionless ballooning modes in axisymmetric toroidal plasmas
[DE82-002831] p 154 N83-16217
- CHENG, E. T.**
Prospects of low-activation fusion-reactor design
[DE82-003198] p 155 N83-16231
- CHENOWETH, J. E.**
Cryo-cooler development for space flight applications p 114 A83-13460
- CHER, M.**
Quality assurance in support of energy related monitoring activities
[PB82-234238] p 16 N83-13657
- CHIAM, H. F.**
Transmittance of reflected diffuse radiation p 38 A83-18564
- CHIANG, Y. F.**
Analysis of two-phase flow solar collectors with application to heat pumps p 27 A83-13481
- CHIDA, K.**
Theoretical temperature dependence of short-circuit current of drift-field solar cells p 24 A83-11991
- CHIN, D.-T.**
Zinc electrode morphology in alkaline solutions. I - Study of alternating voltage modulation on a rotating disk electrode p 115 A83-15867
- CHIOU, M. J.**
Computer modeling of mixing and agglomeration in coal-conversion reactors Volume 1 Model formulation
[DE82-014836] p 84 N83-10212
- CHRETIEN, J. P.**
Analytic tools for the electrical design of solar generators p 66 N83-14727
- CHRIEN, R. E.**
Measurements of fusion reactions from a Tokamak plasma p 124 N83-10926
- CHRISTENSEN, L. S.**
Performance results of a 300 MWh generator at high magnetic field
[AIAA PAPER 83-0394] p 117 A83-16690
- CHRISTMAN, W. M., III**
The feasibility of refuse-fired energy generation in Philadelphia, Pennsylvania p 88 N83-10587
- CHU, C. T.**
Development of geothermal binary-cycle working-fluid properties Information and analysis of cycles
[DE82-021542] p 102 N83-13602
- CHUNG, K. C.**
Automated probe microdistillation/mass spectrometry for the analysis of high-molecular weight compounds in fossil fuels
[PB82-022039] p 95 N83-12202
- CHURNEY, K. L.**
An oxygen flow calorimeter for determining the heating value of kilogram size samples of municipal solid waste p 87 N83-10580
- CHUSN, G., JR.**
Low- to moderate-temperature geothermal resource assessment for Nevada Area specific studies, Pumpernickel Valley, Carlin and Moana
[DE82-018598] p 98 N83-12584
- CIAS, B.**
Attempt to determine the power demand of a helicopter control system on the basis of flight tests p 1 A83-10439
- CINI, M.**
Exactly soluble model for a solar cell with nonlinear recombination p 24 A83-11811
- CIONI, J. L.**
Large area low-cost space solar cell development p 62 N83-14699
- CLAASEN, D. B. V. R.**
Landsat for resource evaluation and management in the Alberta foothills p 80 A83-14256
- CLARK, R. N.**
The USDA agricultural wind energy research program p 147 N83-15914
- CLARKSON, J. E.**
Fluidized-bed pyrolysis of oil shale Oil yield, composition, and kinetics
[DE82-021010] p 97 N83-12571
- CLAUSING, A. M.**
An experimental investigation of convective losses from solar receivers
[JULI-ENG-81-4003] p 39 N83-10500
- CLAYBOURN, M.**
Electrophoretic Cds/Cu₂S solar cells for space applications p 63 N83-14704
- CLEAR, T. D.**
Advanced high-temperature thermal energy storage media for industrial applications
[DE82-000161] p 168 N83-15945
- CLEMMER, R. G.**
Wildcat A catalyzed D-D Tokamak reactor
[DE82-013712] p 125 N83-10938
- CLOYD, J. S.**
Testing of an improved lithium-sulfur dioxide battery for aircrew life support equipment
[AD-A119374] p 163 N83-13592
- COATE, D.**
Alternative electric generation impact simulator
[PB82-180324] p 3 N83-10302
- COCHRAN, R. L.**
Evaluation of olivine ceramic refractones for thermal-energy-storage application
[DE82-000108] p 168 N83-15947
- COGHLAN-JORDAN, K.**
Emerging technologies for the control of hazardous wastes
[PB82-236993] p 17 N83-13666
- COHEN, R. L.**
Particle size distribution of Ni microprecipitates in LaNi₅ used for hydrogen storage p 75 A83-12295
- COHEN, S. A.**
Deuterium flux measurements in the edge plasmas of PLT and PDX during auxiliary heating experiments
[DE82-001909] p 139 N83-15143
- COLLINS, B. P.**
Estimation of aircraft fuel consumption p 1 A83-10186
- COLLIS, W. J.**
Solar-cell testing and evaluation
[DE82-016179] p 52 N83-12562
- COLUCCI, E.**
Thermal storage performance calculations by closed form and finite difference solutions
[ASME PAPER 82-HT-52] p 26 A83-12799
- COLUZZI, B.**
Global solar radiation estimation from relative sunshine hours in Italy p 26 A83-12951
- COMPERE, A. L.**
Chemicals enhanced oil recovery
[DE82-003475] p 105 N83-14206
- CONEL, J. E.**
Remote sensing and uranium exploration at Lisbon Valley, Utah p 77 A83-10032
- CONINE, D. L.**
Superior heat-transfer fluids for solar heating and cooling applications Results of acute oral-toxicity determinations
[DE82-002758] p 52 N83-12560
- CONNELL, J. R.**
The spectrum of wind speed fluctuations encountered by a rotating blade of a wind energy conversion system p 114 A83-13695
- CONTI, M.**
A parametric analysis of the performances of a linear collectors' network of a solar power plant p 36 A83-18139
- CONWAY, E. J.**
GaAs solar cells p 72 N83-15836
- COOK, R. L.**
Remote sensing of coal-fired MHD by optical diagnostic techniques
[AIAA PAPER 83-0469] p 80 A83-16736
- COOK, T. L.**
Numerical simulation of fluid flow in porous/fractured media
[DE82-002631] p 107 N83-14454
- COOMBS, M. G.**
High-temperature ceramic heat exchanger element for a solar thermal receiver p 26 A83-13476
High-temperature ceramic heat exchanger element for a solar thermal receiver p 44 N83-10543
A high temperature ceramic heat exchanger element for a solar thermal receiver
[NASA-CR-169625] p 58 N83-14666
- COOPER, L.**
Measurement of high-temperature high-pressure processes A summary report
[PB82-196932] p 98 N83-12667
- COOPER, M. H.**
Applications of a high temperature radiation resistant electrical insulation p 144 N83-15874
- COPPI, B.**
Lower hybrid RF current drive and electron-cyclotron heating on the Versator 2 Tokamak
[DE82-017127] p 125 N83-10934
- CORNISH, D. N.**
Assessment of some of the problems in the USA of superconducting magnets for fusion research
[DE82-003066] p 137 N83-15111
Utilizing subcooled, superfluid He-II in the design of a 12-Tesla tandem-mirror experiment
[DE82-003322] p 138 N83-15133
Magnet and conductor developments for the mirror fusion program
[DE82-001062] p 139 N83-15136
- CORRIGAN, R. D.**
The effect of yaw on horizontal axis wind turbine loading and performance
[NASA-TM-82778] p 136 N83-14688
Measured performance of a tip-controlled, teetered rotor with an NACA 64 sub 3-618 tip airfoil
[NASA-TM-82870] p 136 N83-14689
- CORY, J. S.**
Approach to Nitinol power plant cost analysis p 112 A83-10656
- COSTELLO, F. A.**
Ti-59 program for calculating the annual energy requirements for residential heating and cooling Volume 1 Users manual
[DE82-010174] p 13 N83-13594
Ti-59 program for calculating the annual energy requirements for residential heating and cooling Volume 2 Program reference manual
[DE82-020275] p 13 N83-13595
- COSTIN, L. S.**
Material properties of Green River oil shale
[DE82-003271] p 111 N83-15801
- COSTOGUE, E. N.**
Polycrystalline silicon availability for photovoltaic and semiconductor industries p 28 A83-13648
- COULBERT, C. D.**
Environmental isolation task p 41 N83-10521
- CRABB, R. L.**
The reduction of radiation damage in space solar cells A study of radiation defects in silicon (+)
p 63 N83-14710
Primary calibration of high efficiency solar cells A comparison of 1980 data from CNES, Nasa (Lewis), JPL and RAE p 64 N83-14717

CRAFOORD, C

Interaction in limited arrays of windmills
[DE82-750056] p 133 N83-13608

CRAIG, S.

Rapid simulated solar absorptance measurements on flat or curved surfaces p 32 A83-15476

CRAMER, D. E.

Generalized characteristics and applicability of various probability distributions for wind energy applications p 112 A83-10654

CRAMER, M.

Williamson Home, Ipswich, Mass solar-energy-system performance evaluation, Nov 1981 - Apr 1982
[DE82-021300] p 53 N83-12574
Isakson Home, Anoka, Minnesota solar-energy-system performance evaluation, Aug 1981 - Mar 1982
[DE82-021297] p 54 N83-12576

CRECELIUS, E. A.

Coal fly ash disposal in the ocean An alternative worth considering
[DE82-003835] p 20 N83-14781

CREGO, D. F.

Energy recovery and cogeneration from an existing municipal incinerator p 5 N83-10589

CRENSHAW, J. M.

Chemicals enhanced oil recovery
[DE82-003475] p 105 N83-14206

CRETTELLA, M. C.

Review - Solar-grade silicon p 29 A83-13677
Hydrogenated a-Si/x/Ge/1-x/- A potential solar cell material p 34 A83-15871

CROW, J. T.

Pulsed power for inertial-confinement fusion
[DE82-001991] p 137 N83-15116

CROWTHER, M. A.

A reference-material system for estimating health and environmental risks of selected material cycles and energy systems
[DE82-019309] p 15 N83-13647

CRUCIUS, M.

Fundamental research into high voltages for further development of electric power distribution systems
[BMFT-FB-T-82-064] p 157 N83-10368

CUDDIHY, E.

Photovoltaic module encapsulation design and materials selection, volume 1, abridged
[NASA-CR-169372] p 45 N83-10553

CUEVAS, A.

50 per cent more output power from an albedo-collecting flat panel using bifacial solar cells p 29 A83-13700

CUMBERBATCH, T. J.

Electrophoretic Cds/Cu₂S solar cells for space applications p 63 N83-14704
Electron and photon degradation of boron doped FZ silicon solar cells p 64 N83-14711

CUOMO, V.

Global solar radiation estimation from relative sunshine hours in Italy p 26 A83-12951

CURTIS, E. H.

Approach to Nitinol power plant cost analysis p 112 A83-10656

CURTIS, H. B.

Determination of optimum sunlight concentration level in space for 3-5 cascade solar cells p 66 N83-14732
Determination of optimum sunlight concentration level in space for 3-5 cascade solar cells p 69 N83-15814
The effect of different solar simulators on the measurement of short-circuit current temperature coefficients p 70 N83-15821

D**DADALEC, V.**

Energy balance in TM-1-MH Tokamak (ohmic heating) p 151 N83-16122

DAGGETT, P. H.

A groundwater convection model for Rio Grande rift geothermal resources p 79 A83-11831

DAHIYA, R. P.

Thermionically emitting copper cathode in contact with combustion plasmas p 116 A83-16101

DAILEY, C. L.

Optimal sun-alignment techniques of large solar arrays in electric propulsion spacecraft
[AIAA PAPER 82-1898] p 25 A83-12475

DALLING, D. K.

A carbon-13 and proton nuclear magnetic resonance study of some experimental referee broadened-specification /ERBS/ turbine fuels p 78 A83-11482

DANG, A.

Effect of off-south orientation on the performance of collector reflector system in India p 30 A83-14671

DANISON, T. H.

Analytical techniques for aromatic components in aircraft fuels
[AD-A118838] p 96 N83-12252

DARADIMOS, G.

Steam generator with circulating atmospheric fluidized bed combustion
[BMFT-FB-T-82-134] p 94 N83-11596

DARBY, R.

Metal chelate catalysts for fuel cells
[PB82-195637] p 131 N83-12592

DARGAN, A. D.

Estimated capacity of US ethanol plants
[PB82-203647] p 82 N83-10154

DAS, R. L.

Distributed photovoltaic systems Utility interface issues and their present status Intermediate/three-phase systems
[NASA-CR-169664] p 61 N83-14686

DATLOV, J.

Lower-hybrid heating experiment on the TM-1-MH Tokamak p 150 N83-16116
Energy balance in TM-1-MH Tokamak (ohmic heating) p 151 N83-16122

DATTA, A. K.

On the open-circuit voltage of a Schottky-barrier MIS solar cell p 36 A83-17770

DAUBACH, R. O.

Remote sensing of coal-fired MHD by optical diagnostic techniques
[AIAA PAPER 83-0469] p 80 A83-16736

DAUD, T.

Advanced Czochralski silicon growth technology for photovoltaic modules
[NASA-CR-169661] p 61 N83-14685

DAUGHERTY, K. E.

Urban waste as a potential source for brick plants p 88 N83-10591

DAVENPORT, R.

An overview of Solar Industrial Process-Heat (SIPH) applications below 120 deg C
[DE82-021360] p 57 N83-13603

DAVIS, H.

Catalytic liquefaction of biomass
[DE82-003329] p 108 N83-14752

DAVIS, S. B.

Ceramic high temperature receiver design and tests p 44 N83-10544

DAW, A. N.

On the open-circuit voltage of a Schottky-barrier MIS solar cell p 36 A83-17770

DAWSON, A. G., III

Incident angle modifiers for flat-plate solar collectors - Analysis of measurement and calculation procedures p 27 A83-13480

DAY, R. D.

Helios movable Hartmann ball
[DE82-000756] p 155 N83-16220

DE SAINT LOUVENT, B.

Wind turbine blades A study of prototypes in a steady regime - Unsteady considerations
[AAAF PAPER NT 81-17] p 113 A83-11777

DE VOS, A.

On the formula for the upper limit of photovoltaic solar energy conversion efficiency p 23 A83-10699

DEAN, K. G.

Radar and infrared remote sensing of geothermal features at Pilgrim Springs, Alaska p 79 A83-12036

DEANGELIS, H. M.

Defect behavior in electron-irradiated boron- and gallium-doped silicon p 70 N83-15823

DEBLASIO, R.

Photovoltaic systems measurements - Status and perspectives p 32 A83-15461

Performance criteria for photovoltaic energy systems, volume 1 p 56 N83-13596

Performance criteria for photovoltaic energy systems, volume 2 p 56 N83-13597

DEFRECE, D.

ELMO Bumpy Torus fusion-reactor design study
[DE82-002388] p 154 N83-16218

DEGGIM, D.

Basic engineering of a 10 t/hr prototype plant for the Vereinigte Elektrizitaetswerke Westfalen (VEW) coal conversion process
[BMFT-FB-T-82-114] p 101 N83-13378

DEIS, G. A.

Methods to enhance blanket power density
[DE82-017467] p 127 N83-10958

DEKITSCH, A.

Development of a 5.5 m diameter vertical axis wind turbine, phase 3
[BMFT-FB-T-82-086] p 122 N83-10624

DEL ALAMO, J.

50 per cent more output power from an albedo-collecting flat panel using bifacial solar cells p 29 A83-13700

DELANCEY, K.

Geochemical studies of cores from the San Juan Basin Research Site, Grants Uranium Region, New Mexico
[DE82-004153] p 108 N83-14795

DELASANTA, D.

Market assessment of photovoltaic power systems for agricultural applications worldwide
[NASA-CR-165541] p 56 N83-13585

DELECOLLE, R.

Study of ground winds in Upper Volta Economic and agronomic consequences for the Sudan-Sahel region of west Africa p 98 N83-12751

DELIL, A. A. M.

Fully controllable heat pipe containing a short electro-osmotic pumping section
[AIAA PAPER 83-0317] p 157 A83-16647

DEMETRIADES, S. T.

The STD/MHD codes - Comparison of analyses with experiments p 116 A83-16105
Self-excited MHD power source for space applications p 141 N83-15849

DEMEYER, F.

Wind power potential in Belgium
[PUBL-SER-B-115] p 86 N83-10563

DEMICHELLIS, F.

Research on the characteristic parameters of thermophotovoltaic /TPV/ converter performance p 24 A83-12029
Evaluation of thermophotovoltaic conversion efficiency p 35 A83-16086

DEMIRJIAN, A. M.

Loading schemes for a 50 MWh diagonally connected MHD generator p 113 A83-10659

DENG, H. -G.

The influence of the interface state on the properties of solar cell semiconductor electrodes p 26 A83-13473

DEROUIN, C. R.

Application of fuel cells to highway and nonhighway transportation
[DE82-004365] p 156 N83-16259

DEUTSCH, M.

Wind-energy program FY 1982 third quarterly review
[DE82-019928] p 133 N83-13714

DEVAN, J. H.

Stress-corrosion studies in coal-liquefaction environments
[DE82-001464] p 100 N83-13240
Corrosion in fractionation systems
[DE82-001441] p 109 N83-15427

DEVOTO, R. S.

Designs of tandem-mirror fusion reactors
[DE82-000845] p 138 N83-15134

DEVRIES, G. J.

Lawrence Berkeley Laboratory neutral-beam engineering test facility power-supply system
[DE82-003044] p 137 N83-15104

DEVRIES, O.

General introduction to wind energy conversion
[NLR-MP-81014-U] p 130 N83-12527

DEWALD, B.

Review of plasma-impurity sources during Tokamak operation
[DE82-017098] p 126 N83-10951

DHARMADHAKARI, V. S.

Study of the photovoltaic effect in thin film barium titanate
[NASA-CR-169435] p 46 N83-10567

DHOORE, F.

Lift off A very fine front metallization geometry technique for high efficiency solar cells p 62 N83-14701

DICKERSON, M. H.

Ideas for implementing air-quality studies in the western Rocky Mountain region
[DE82-000063] p 22 N83-15960

DICKS, J. B.

MHD power Overview p 140 N83-15846

DICKSON, W. R.

Sampling for high-molecular-weight organic compounds in power plant stack gases
[PB82-234618] p 16 N83-13659

DIESSNER, A.

Fundamental research into high voltages for further development of electric power distribution systems
[BMFT-FB-T-82-064] p 157 N83-10368

DIETRICH, D. E.

Computer modeling of mixing and agglomeration in coal-conversion reactors Volume 1 Model formulation
[DE82-014836] p 84 N83-10212

- DINEEN, J.**
A conceptual study of the potential for automotive-derived and free-piston Stirling engines in 30- to 400-kilowatt stationary power applications
[NASA-CR-165274] p 121 N83-10568
- DION, D. R.**
Computer modeling of mixing and agglomeration in coal-conversion reactors Volume 1 Model formulation
[DE82-014836] p 84 N83-10212
- DIPPOLITO, D. A.**
Reduction of neoclassical losses in magnetic-confinement devices
[DE82-020277] p 132 N83-13003
- DITTRICH, A.**
Prototype solar house Study of the scientific evaluation and feasibility of a research and development project
[BMFT-FB-T-82-137] p 49 N83-11598
- DITZLER, H.**
Dry processing of power plant coal rich in inerts
[BMFT-FB-T-82-101] p 90 N83-10631
- DIVONE, L. V.**
The federal wind energy program p 146 N83-15909
- DLOTT, E. H.**
Wind power for the electric-utility industry Policy incentives for fuel conservation p 1 A83-11896
- DODDAPANENI, N.**
High efficiency lithium-thionyl chloride cell
[AD-A118696] p 131 N83-12537
- DODERER, E.**
Development of the trickle roof cooling and heating system Experimental plan
[DE82-019082] p 57 N83-13615
- DODGE, D. M.**
Rocky Flats small wind systems program An update p 146 N83-15912
- DOERRSCHEIDT, W.**
Development of the sodium/sulfur batteries, phase 2
[BMFT-FB-T-82-142] p 162 N83-11599
- DOGGETT, J. N.**
Designs of tandem-mirror fusion reactors
[DE82-000845] p 138 N83-15134
- DOHERTY, T. J.**
Aquifer stability investigation
[DE82-003831] p 166 N83-14754
- DOLLERY, A. A.**
Electron and photon degradation of boron doped FZ silicon solar cells p 64 N83-14711
CMX-50 A new ultra thin solar cell cover for lightweight arrays p 66 N83-14726
- DOMALSKI, E. S.**
An oxygen fuel calorimeter for determining the heating value of kilogram size samples of municipal solid waste p 87 N83-10580
- DOMARIN, M. G.**
Emission characteristics of refractory materials p 116 A83-16019
- DOOLEY, G. R.**
Application of fuel cells to highway and nonhighway transportation
[DE82-004365] p 156 N83-16259
- DOOLEY, J. L.**
Concept evaluation of automotive propulsion using liquid air/nitrogen, task 5 report p 129 N83-12439
- DOUGLAS, R. R.**
Conceptual design of the 7 megawatt MOD-5B wind turbine generator p 147 N83-15920
- DOWNING, R. G.**
Solar cell radiation handbook
[NASA-CR-169662] p 61 N83-14687
- DREVINSKY, P. J.**
Defect behavior in electron-irradiated boron- and gallium-doped silicon p 70 N83-15823
- DRIGGERS, H. H.**
The application of energy saving concepts to future fighter/attack aircraft design
[AIAA PAPER 83-0092] p 2 A83-16516
- DROST, M. K.**
Evaluation of solar-air-heating central-receiver concepts
[DE82-016924] p 48 N83-11586
- DUBILOVICH, V. M.**
Investigation of the equations of motion of the heliostats of a tower-type solar electric power plant p 31 A83-15133
- DUGAS, J.**
Transport of solar energy with optical fibres p 29 A83-13698
- DUMAS, K. A.**
Optical absorption coefficient and minority carrier diffusion length measurements in low-cost silicon solar cell material p 30 A83-13922
- DUNCAN, C. S.**
Large-area sheet task advanced dendritic web growth development
[NASA-CR-169624] p 58 N83-14665
- Large-area sheet task advanced dendritic web growth development
[NASA-CR-169639] p 59 N83-14669
- Large-area sheet task advanced dendritic web growth development
[NASA-CR-169637] p 59 N83-14675
- DURAND, F.**
Data report for the Southwest Residential Experiment Station, Mar 1982
[DE82-020400] p 52 N83-12556
- DUTRIEU, E.**
Analytic tools for the electrical design of solar generators p 66 N83-14727
- DYER, P. N.**
Catalyst and reactor development for a liquid-phase Fischer-Tropsch process
[DE82-003369] p 105 N83-14207
- DYLLA, H. F.**
Deuteron flux measurements in the edge plasmas of PLT and PDX during auxiliary heating experiments
[DE82-001909] p 139 N83-15143
- ## E
- EASTMAN, G. Y.**
The need for improved heat pipe fluids p 159 N83-15892
Enhanced heat pipe theory and operation p 145 N83-15893
- EATON, F. D.**
Radar and infrared remote sensing of geothermal features at Pilgrim Springs, Alaska p 79 A83-12036
- EBELING, W. D.**
Optimization of silicon solar cells for solar generators with concentration p 63 N83-14707
- EBERENDU, A.**
Urban waste as a potential source for brick plants p 88 N83-10591
- EBERLEIN, D.**
The modal split in the Japanese passenger transportation system
[DFVLR-FB-82-09] p 9 N83-11887
- EBERSBACH, K. F.**
Study of the possibilities of more rational use of energy in the sector of trade and commerce, part 1
[BMFT-FB-T-82-076-PT-1] p 5 N83-10618
Study of the possibilities of more rational use of energy in the sector of trade and commerce, part 2
[BMFT-FB-T-82-077-PT-2] p 7 N83-11591
- EBNER, W. B.**
Lithium-sulfur dioxide (Li/SO₂) battery safety hazards Thermal studies
[AD-A119381] p 163 N83-13591
- ECHOLDS, E. F.**
A lightweight electronically commutated dc motor for electric passenger vehicles
[NASA-CR-165601] p 119 N83-10348
- ECKERT, E. R. G.**
Heat transfer - A review of 1981 literature p 169 A83-17701
- EDWARDS, B. H.**
Emerging technologies for the control of hazardous wastes
[PB82-236993] p 17 N83-13666
- EDWARDS, M. B.**
Geologic studies of geopressured and hydrogeopressured zones in Texas Test well site selection
[PB82-220542] p 94 N83-11653
- EGUREN, J.**
50 per cent more output power from an albedo-collecting flat panel using bifacial solar cells p 29 A83-13700
- EHST, D. A.**
Wildcat A catalyzed D-D Tokamak reactor
[DE82-013712] p 125 N83-10938
- EINSTEIN, H.**
Parametric behavior of the circulating zinc-bromine battery
[DE82-001910] p 167 N83-14759
- EL-SHIRBEENY, E.-H. T.**
Design of electronic optimizer for solar electric drive system p 36 A83-17150
- ELACHI, C.**
Exploration for fractured petroleum reservoirs using radar/Landsat merge combinations p 77 A83-10031
- ELDERS, W. A.**
An integrated model for the natural flow regime in the Cerro Prieto hydrothermal system, B.C., Mexico, based upon petrological and isotope geochemical criteria
[DE82-001980] p 107 N83-14658
Use of wireline logs at Cerro Prieto in identification of the distribution of hydrothermally altered zones and dike locations and their correlation with reservoir temperatures
[DE82-001981] p 107 N83-14661
- ELDRIDGE, O. C.**
Second-cyclotron-harmonic emission measurements on ISX-B
[DE82-009938] p 126 N83-10949
- ELISEEV, V. B.**
Emission characteristics of refractory materials p 116 A83-16019
- ELLER, V. L.**
Energy recovery and cogeneration from an existing municipal incinerator p 5 N83-10589
- ELLINGSON, W. A.**
Materials technology for coal-conversion processes
[DE82-004036] p 96 N83-12253
- ELLIOTT, D. C.**
Kinetics and catalysis of producing synthetic gases from biomass
[PB82-214347] p 82 N83-10156
- ELNAHWY, S.**
Thin film polycrystalline Si p-n junction solar cells with preferential doping p 36 A83-17766
- ELTER, M. R.**
Thermal energy storage testing facilities
[DE82-000110] p 168 N83-15948
- ELWELL, D.**
Electrolytic deposition of low-cost, high-purity polysilicon suitable for use in solar-cell devices
[DE82-012428] p 51 N83-12552
- ENDLICH, R. M.**
A diagnostic model for estimating winds at potential sites for wind turbines p 79 A83-12954
An assessment of wind energy resource for northwestern California p 80 A83-18456
- ENGLADE, R. C.**
Lower hybrid RF current drive and electron-cyclotron heating on the Versator 2 Tokamak
[DE82-017127] p 125 N83-10934
- ENGLAND, A. C.**
Second-cyclotron-harmonic emission measurements on ISX-B
[DE82-009938] p 126 N83-10949
- ENSLER, E. F.**
Assessment of high heat-transfer evaporators as power plant condensers to produce abundant freshwater
[PB82-198045] p 7 N83-11277
- EPLER, J. L.**
Health effects research in direct coal liquefaction Studies of H-coal distillates Phase 1 PDU samples, the effects of hydrotreatment
[DE82-003702] p 18 N83-14302
- ERGASHEV, S. F.**
Testing of the energy module of a parabolocylindrical solar installation p 31 A83-15130
- ERMILOV, A. N.**
Emission characteristics of refractory materials p 116 A83-16019
- ERNST, D. M.**
The need for improved heat pipe fluids p 159 N83-15892
Enhanced heat pipe theory and operation p 145 N83-15893
- ERNST, W.**
Automotive Stirling engine development program
[NASA-CR-167907-2] p 140 N83-15176
Automotive Stirling engine development program
[NASA-CR-167907-1] p 140 N83-15177
- ERWIN, J.**
Tests of blending and correlation of distillate fuel properties p 78 A83-11050
- ESKINAZI, S.**
Generalized characteristics and applicability of various probability distributions for wind energy applications p 112 A83-10654
- ESROM, H.**
Development of the sodium/sulfur batteries, phase 2
[BMFT-FB-T-82-142] p 162 N83-11599
- ESTOQUE, M. A.**
A diagnostic model for estimating winds at potential sites for wind turbines p 79 A83-12954
- ETSION, I.**
Energy efficient face seal
[NASA-CR-165591] p 21 N83-15659
- ETZLER, C. C.**
Development of a 5.5 m diameter vertical axis wind turbine, phase 3
[BMFT-FB-T-82-086] p 122 N83-10624
- EULER, K.-J.**
Batteries and fuel cells Design, employment, chemistry p 115 A83-14041
- EUSTIS, R. H.**
Inflow disk generator for open-cycle MHD power generation p 116 A83-16104
- EVANS, D. G.**
Assessment of alternative power sources for mobile mining machinery
[NASA-TM-82695] p 136

EVANS, J. C., JR.

- Planar multijunction high voltage solar cell chip
p 30 A83-13923
- Heat transparent high intensity high efficiency solar cell
[NASA-CASE-LEW-12892-1] p 61 N83-14692
- EVANS, K., JR.
Wildcat A catalyzed D-D Tokamak reactor
[DE82-013712] p 125 N83-10938
- EVANS, R. M.
Environmental assessment of stationary source NOx control technologies
[PB82-249350] p 16 N83-13665

F

FACCHINI, U.

- Determination of the interference between the elements of a central-receiver solar system p 24 A83-11848

FAHRENBRUCH, A. L.

- Transport mechanisms for Mg/Zn3P2 junctions
p 35 A83-16071

FALCINELLI, R.

- On the 40kW test power plant modification and development, phase 2
[PB82-216102] p 122 N83-10637

FALKENBERG, R. J.

- Alcoa ALVAWT program p 148 N83-15928

FALLON, P. T.

- Flash hydrolysis of coal for conversion to liquid and gaseous fuels
[DE82-019435] p 100 N83-13197

FAN, J. C. C.

- Radiation damage and annealing in large area n+/p/p+ GaAs shallow homojunction solar cells
p 71 N83-15826

FANNEY, A. H.

- Analytical and experimental analysis of procedures for testing solar domestic hot water systems
[PB82-184839] p 49 N83-12287

FARIA ALVES, C. L.

- Studies on radiation intensity distribution in the focus of compound parabolic concentrators
p 38 A83-18565

FARNUM, B. W.

- Liquefaction behavior of an Australian brown coal in comparison to that of two US lignites
[DE82-021977] p 95 N83-12201

FARNUM, S. A.

- Liquefaction behavior of an Australian brown coal in comparison to that of two US lignites
[DE82-021977] p 95 N83-12201

FAY, J. A.

- Scale effects in liquefied fuel vapor dispersion
[DE82-006198] p 11 N83-12659

FEIGELSON, R. S.

- Electrolytic deposition of low-cost, high-purity polysilicon suitable for use in solar-cell devices
[DE82-012428] p 51 N83-12552

FELDERMAN, E. J.

- Performance results of a 300 MWth generator at high magnetic field
[AIAA PAPER 83-0394] p 117 A83-16690

FELDMAN, H. F.

- Conversion of forest residues to a methane-rich gas in a high-throughput gasifier
[DE82-020289] p 102 N83-13601

FELLAS, C. N.

- Anti-static coat for solar arrays p 67 N83-14738

FENTON, H. A.

- Residential photovoltaic experiment station data system
[DE82-001646] p 68 N83-14762

FERBER, R. R.

- Polycrystalline silicon availability for photovoltaic and semiconductor industries p 28 A83-13648

FERDINAND, J.

- Diagnostics of nonequilibrium hydrogen plasma
p 153 N83-16135

FERET, J. M.

- Cell module and fuel conditioner development
[NASA-CR-165462-A] p 130 N83-12524

FERNANDEZ, V. M.

- Oxygen evolution improvement at a Cr-doped SrTiO3 photoanode by a Ru-oxide coating p 33 A83-15493

FERRY, J. G.

- Microbiological studies towards optimization of methane from marine plant biomass
[PB82-214362] p 92 N83-10756

FIGUEROA, C.

- Catalytic liquefaction of biomass
[DE82-003329] p 108 N83-14752

FILPUS, J.

- Measurements of energy distribution and thrust for microwave plasma coupling of electrical energy to hydrogen for propulsion
[AIAA PAPER 82-1951] p 75 A83-12508

FINELLI, G. B.

- Economic modeling of fault tolerant flight control systems in commercial applications p 1 A83-11156

FINKE, R. C.

- Direct conversion of infrared radiant energy for space power applications p 73 N83-15865

FIORE, C. L.

- Lower-hybrid-heating experiments on the Alcator C and the Versator II Tokamaks
[DE82-013674] p 132 N83-13007

FISCHER, A.

- Study of the possibilities of more rational use of energy in the sector of trade and commerce, part 1
[BMFT-FB-T-82-076-PT-1] p 5 N83-10618

- Study of the possibilities of more rational use of energy in the sector of trade and commerce, part 2
[BMFT-FB-T-82-077-PT-2] p 7 N83-11591

FISCHER, W.

- Reconstruction and testing of the flue gas desulfurizing plant Weiher 2
[BMFT-FB-T-82-108] p 91 N83-10652
- Development of the sodium/sulfur batteries, phase 2
[BMFT-FB-T-82-142] p 162 N83-11599

FISHER, A. S.

- Lower hybrid RF current drive and electron-cyclotron heating on the Versator 2 Tokamak
[DE82-017127] p 125 N83-10934

FISHER, R.

- Coal preparation and testing p 86 N83-10573

FISKE, R. P.

- The use of buoyancy to lift heavy objects from the sea
[AO-A119320] p 106 N83-14306

FITZPATRICK, G. O.

- Effects of reactor design, component characteristics and operating temperatures on direct conversion power systems p 142 N83-15857
- Thermionic conversion for space power application
p 144 N83-15886

FLADERER, R.

- Phototype plant for Nuclear Process Heat (NPH), reference phase R and D work on Hydrogenated Coal Gasification (HCG) Further operation of semi-industrial plant for hydrogenated coal gasification
[BMFT-FB-T-82-098] p 90 N83-10625

FLAIM, T.

- Wind-energy program FY 1982 third quarterly review
[DE82-019928] p 133 N83-13714

FLEETER, R.

- Antimisting kerosene atomization and flammability
[NASA-CR-169385] p 95 N83-12246

FLEISCHMANN, R.

- Crude gas/air fuel cells with a phosphoric acid matrix
[BMFT-FB-T-82-167] p 128 N83-11601

FLETCHER, C. A. J.

- Aerodynamic platform comparison for jet-stream electricity generation p 116 A83-16102
- On the rotary wing concept for jet stream electricity generation p 117 A83-16111

FLOOD, D. J.

- NASA space photovoltaic research and technology programs p 64 N83-14713
- NASA-CAST program in photovoltaic energy conversion p 68 N83-15807

- Radiation damage and annealing in large area n+/p/p+ GaAs shallow homojunction solar cells
p 71 N83-15826

FLORES, F.

- Literature survey of properties of syngases derived from coal
[NASA-TM-82739] p 83 N83-10208

FLYNN, T.

- Low- to moderate-temperature geothermal resource assessment for Nevada Area specific studies, Pumpernickel Valley, Carlin and Moana
[DE82-018598] p 98 N83-12584

FLYTZANI-STEPHANPOULOS, M.

- Catalytic autothermal reforming increases fuel cell flexibility p 74 A83-11794

FODOR, J.

- Thin cell development and testing p 62 N83-14702

FOLSOM, D. W.

- Conversion of forest residues to a methane-rich gas in a high-throughput gasifier
[DE82-020289] p 102 N83-13601

FONASH, S. J.

- Solar cell device physics p 27 A83-13501

FOOTE, J. H.

- Plasma parameter measurements using neutral-particle-beam attenuation
[DE82-021120] p 132 N83-13001

FORBES, R. B.

- Radar and infrared remote sensing of geothermal features at Pilgrim Springs, Alaska p 79 A83-12036

FORD, L. B.

- Thermal reactor
[NASA-CASE-NPO-14369-1] p 75 N83-10501

FOREMAN, K. M.

- Economics of DAWT wind energy systems
p 150 N83-15939

FORESTIERI, A. F.

- Evaluation of electrode shape and nondestructive evaluation method for welded solar cell interconnects
[NASA-TM-82966] p 45 N83-10555

- On the cause of the flat-spot phenomenon observed in silicon solar cells at low temperatures and low intensities p 63 N83-14705

FORMAN, S.

- Performance criteria for photovoltaic energy systems, volume 1
[DE82-021958] p 56 N83-13596

- Performance criteria for photovoltaic energy systems, volume 2
[DE82-021683] p 56 N83-13597

FORT, J. A.

- Evaluation of solar-air-heating central-receiver concepts
[DE82-016924] p 48 N83-11586

FORTEA, J.-P.

- A study of different techniques for cooling solar cells in centralized concentrator photovoltaic power plants
p 30 A83-14109

FORTUNATO, G.

- Exactly soluble model for a solar cell with nonlinear recombination p 24 A83-11811

FOSTER, B. A.

- An efficient fully implicit simulator
[CSS-126] p 109 N83-15322

FOSTER, D. E.

- Alcohol as a fuel for farm and construction equipment
[DE82-021022] p 100 N83-13277

FOWLE, A. A.

- Two-phase heat transport for thermal control
p 159 N83-15894

FOX, G.

- Project analysis and integration area
p 41 N83-10524

FOX, R. H. W.

- Progress and development status of the Space Telescope solar array p 67 N83-14736

- Future developments and applications for the Space Telescope solar array p 67 N83-14737

FRAAS, A. P.

- Technological boundary conditions for nuclear electric space power plants p 142 N83-15856

FRANCESCA, M.

- Global solar radiation estimation from relative sunshine hours in Italy p 26 A83-12951

FRANCOIS, J. C.

- The optical properties of titanium nitrides and carbides
Spectral selectivity and photothermal conversion of solar energy p 33 A83-15490

FRANK, H. A.

- Correlation of design with performance of primary lithium-sulfur oxyhalide cells
[NASA-CR-169369] p 120 N83-10504

FREEMAN, J. W.

- The phototron A light to RF energy conversion device p 143 N83-15866
- Interaction between the SPS solar power satellite solar array and the magnetospheric plasma p 73 N83-15868

FREIHAUT, J. D.

- Reaction-induced temperature deviations during coal devolatilization in a heated grid
[DE82-003864] p 106 N83-14300

FREY, W. E.

- Evaluation of electrode shape and nondestructive evaluation method for welded solar cell interconnects
[NASA-TM-82966] p 45 N83-10555

- Evaluation of solar cell welds by scanning acoustic microscopy p 72 N83-15834

FRIEDEL, W.

- Thermochemical heat storage State-of-the-art report
[PB82-188087] p 162 N83-11610

FRIEDMAN, R.

- Recent trends in aviation turbine fuel properties
[NASA-TP-2056] p 92 N83-11340

FRIEDRICH, H. J.

- Simple anemometer for wind classification
[BMFT-FB-T-82-106] p 92 N83-10719

FRISCH, J.

- Assessment of high heat-transfer evaporators as power plant condensers to produce abundant freshwater
[PB82-198045] p 7 N83-11277

PERSONAL AUTHOR INDEX

GREENE, S. V.

- FRITZSCHE, A.**
Development of a 5.5 m diameter vertical axis wind turbine, phase 3 [BMFT-FB-T-82-086] p 122 N83-10624
- FROST, R. J.**
Evaluation of short-term NO₂ plume models for point sources. Volume 1 Technical discussion [PB82-234328] p 16 N83-13658
- FROUNFELKER, R.**
Conversion of municipal solid waste to energy, Jacksonville, Florida p 5 N83-10593
- FRUCHTER, E.**
An experimental investigation of a stationary reflector/tracking absorber solar collector at intermediate temperatures p 27 A83-13479
- FRY, R. J. M.**
Health effects research in direct coal liquefaction Studies of H-coal distillates. Phase 1 PDU samples; the effects of hydrotreatment [DE82-003702] p 18 N83-14302
- FUCHS, H.**
Determination of climatological parameters of global radiation and direct solar radiation for horizontal, not horizontal, fixed and normal incident radiation absorber [BMFT-FB-T-82-070] p 48 N83-10718
- FUCHS, V.**
Radial effects in heating and thermal stability of a sub-ignited Tokamak [DE82-009384] p 124 N83-10932
- FUESSL, B.**
Research and development on a MIS thin film solar cell made of amorphous silicon [BMFT-FB-T-82-079] p 47 N83-10620
- FUHRMANN, F.**
Pressure-swinging underground gasification Theoretical and experimental investigations of gasification, phase 2 [BMFT-FB-T-82-066] p 89 N83-10615
- FUJITA, T.**
Configuration selection study for isolated loads using parabolic dish modules p 45 N83-10548
- FUJIWARA, M.**
Non-circular bumpy torus [IPPJ-807] p 134 N83-13990
- FURUYA, O.**
Technical and economical assessment on Tethered Wind-Energy Systems (TWES) [DE82-017120] p 121 N83-10604

G

- GABILLI, E.**
Self-annealed ion implanted solar cells p 25 A83-12290
- GADKOWSKI, M.**
Water demand for generating electricity: A mathematical programming approach with application in Poland [IASA-RR-82-16] p 158 N83-10498
- GAFFNEY, P. W.**
Rippling modes in the edge of a Tokamak plasma [DE82-007724] p 125 N83-10940
- GAGEY, B.**
Study of the ionic distribution and of the energy deposition in a plasma of Tokamak heated by injection of fast neutrals [EUR-CEA-FC-1094] p 155 N83-16226
- GAIA, M.**
Test results of a medium temperature solar engine p 115 A83-16000
- GALLOWAY, C. W.**
Gas-to-hydraulic power converter [NASA-CASE-MSC-18794-1] p 136 N83-14693
- GAMZE, M. G.**
The 40kW fuel cell field test support [PB82-231630] p 133 N83-13633
- GANDY, R.**
Lower-hybrid-heating experiments on the Alcator C and the Versator II Tokamaks [DE82-013674] p 132 N83-13007
- GAO, X.**
Alcohol as a fuel for farm and construction equipment [DE82-021022] p 100 N83-13277
- GARCIA, L.**
Resistive MHD studies of high-beta Tokamak plasmas [DE82-008101] p 126 N83-10942
Resistive MHD studies of high-beta-Tokamak plasmas [DE82-001478] p 139 N83-15141
- GARNER, C. M.**
Process for high photocurrent in IBC solar cells p 24 A83-12059
- GARRETTPRICE, B. A.**
Evaluation of solar-air-heating central-receiver concepts [DE82-016924] p 48 N83-11586

- GARRISON, J. D.**
A new evacuated CPC collector tube p 37 A83-18558
- GASSAWAY, J. D.**
Remote sensing of coal-fired MHD by optical diagnostic techniques [AIAA PAPER 83-0469] p 80 A83-16736
- GASSNER, G.**
Stationary flywheel energy storage systems [PB82-238130] p 165 N83-13637
- GATES, W. R.**
Potential benefits from a successful solar thermal program p 3 N83-10547
Solar thermal technologies benefits assessment. Objectives, methodologies and results for 1981 [NASA-CR-169373] p 4 N83-10551
- GATOS, H. C.**
Microdistribution of oxygen in silicon and its effects on electronic properties p 71 N83-15825
- GATTO, L. W.**
Ice distribution and winter surface circulation patterns, Kachemak Bay, Alaska p 1 A83-12038
- GAY, B. M.**
Evaluation of olivine ceramic refractories for thermal-energy-storage application [DE82-000108] p 168 N83-15947
- GEHART, J. E.**
Components identified in energy-related wastes and effluents [PB82-236985] p 101 N83-13283
- GEGBE, H.**
Urban waste as a potential source for brick plants p 88 N83-10591
- GENUNG, R. K.**
ANFLOW Characterization and development of an energy conserving wastewater treatment system p 4 N83-10585
- GERKEN, H.**
Determination of friction coefficients on several distant heat pipe sections with different sliding partners [BMFT-FB-T-82-095] p 158 N83-10397
- GERLACH, L.**
The design of the L-SAT solar array p 66 N83-14730
- GERSHUNI, A. N.**
The effect of the parameters of metal-fiber capillary structures on the maximum heat-transfer capability of thermal pipes p 156 A83-11515
- GETSI, J. A.**
Biomedical and environmental sciences programs at the Oak Ridge National Laboratory [DE82-019897] p 13 N83-13516
- GHANDHI, S. K.**
Diffused P+-N solar cells in bulk GaAs p 69 N83-15818
- GHASSEMI, M.**
A compendium of synfuel end use testing programs [PB82-236936] p 100 N83-13279
- GIBBONS, D. J.**
Electrophoretic Cds/Cu₂S solar cells for space applications p 63 N83-14704
- GIBBONS, J. F.**
CW-laser annealed solar cells p 23 A83-10638
- GILARDI, R.**
Structural characterization of materials for high energy space systems p 171 N83-15883
- GILHAUS, A.**
Stationary flywheel energy storage systems [PB82-238130] p 165 N83-13637
- GILL, M.**
Estimated capacity of US ethanol plants [PB82-203647] p 82 N83-10154
- GILLILAND, R. G.**
Power conditioning unit development for MAG-TRANSIT p 113 A83-11021
- GILMOUR, A. S., JR.**
Investigation of power processing technology for spacecraft applications [AD-A119644] p 135 N83-14151
- GIRARD, J.-P.**
An experimental study and modeling of heat transfer in boilers of small and medium power p 80 A83-15841
- GIRNUS, R.**
Determination of friction coefficients on several distant heat pipe sections with different sliding partners [BMFT-FB-T-82-095] p 158 N83-10397
- GLASGOW, J. C.**
The effect of yaw on horizontal axis wind turbine loading and performance [NASA-TM-82778] p 136 N83-14688
Measured performance of a tip-controlled, teetered rotor with an NACA 64 sub 3-618 tip airfoil [NASA-TM-82870] p 136 N83-14689

- GLASS, D. R.**
Study of the formation of submicron particulates generated by coal combustion [DE82-003268] p 21 N83-15401
- GLATTHAAR, R.**
Refrigeration system of superconducting generators for large power plants [BMFT-FB-T-82-071] p 120 N83-10369
- GLOVER, R. L.**
Impact of NO_x selective catalytic reduction processes on flue gas cleaning systems [PB82-240086] p 18 N83-13664
- GOCKENBACH, E.**
Fundamental research into high voltages for further development of electric power distribution systems [BMFT-FB-T-82-064] p 157 N83-10368
- GOERZ, D. A.**
The MFTF-B plasma diagnostic system [DE82-002594] p 155 N83-16228
- GOETHALS, R.**
Wind turbine blades A study of prototypes in a steady regime - Unsteady considerations [AAAF PAPER NT 81-17] p 113 A83-11777
- GOETT, A.**
Residential End-use Energy Planning System (REEPS) [DE82-906444] p 14 N83-13819
- GOETZBERGER, A.**
Solar energy conversion based on the principle of fluorescent collectors [BMFT-FB-T-82-081] p 47 N83-10621
- GOLD, T.**
Studies related to the deep earth gas [PB82-227653] p 84 N83-10213
- GOLDBERG, V. R.**
A transmittance-optimized, point-focus Fresnel lens solar concentrator p 42 N83-10530
- GOLDSMITH, P.**
Ultra lightweight solar array technology p 66 N83-14729
- GOLDSTEIN, R. J.**
Heat transfer - A review of 1981 literature p 169 A83-17701
- GOLENKO, Z.**
Evaluation of plasma jet ignition for improved performance of alternate fuels [AD-A120160] p 112 N83-16212
- GOLOVNER, T. M.**
Determination of the integral currents of solar cells using an improved method of spectral sensitivity measurement p 23 A83-11696
- GONZALEZ-SANABRIA, O.**
Polyvinyl alcohol membranes as alkaline battery separators [NASA-TM-82961] p 119 N83-10135
- GOODALE, B. A.**
The 40 kW intermediate SWECs program p 148 N83-15925
- GOODMAN, C. H. L.**
Direct-gap group IV semiconductors based on tin p 22 A83-10294
- GORADIA, C.**
Radiation damage in front and back illuminated high resistivity silicon solar cells [NASA-TM-82965] p 48 N83-10962
- GORDON, K.**
Electric-utility solar-energy activities. 1981 survey [DE82-905804] p 57 N83-13623
- GOSWAMI, A.**
Solar MHD systems with two-phase flow with magnetic liquid metal p 141 N83-15851
- GOVINDACHARYULU, P. A.**
Large grain polycrystalline silicon from rice husk p 33 A83-15492
- GRANNEMANN, W. W.**
Study of the photovoltaic effect in thin film barium titanate [NASA-CR-169435] p 48 N83-10567
- GRANT, J. F.**
Evaluation of plasma jet ignition for improved performance of alternate fuels [AD-A120160] p 112 N83-16212
- GRAVES, R. D.**
Solar MHD systems with two-phase flow with magnetic liquid metal p 141 N83-15851
- GRAY, J. L.**
High-intensity solar cells [DE82-020420] p 51 N83-12550
- GREENBAUM, E.**
Photosynthetic water splitting [PB82-200684] p 76 N83-12206
- GREENE, S. V.**
Chemicals enhanced oil recovery [DE82-003475] p 105 N83-14206

GREENWALD, M. J.

- GREENWALD, M. J.**
Lower-hybrid-heating experiments on the Alcator C and the Versator II Tokamaks
[DE82-013674] p 132 N83-13007
- GREENWOOD, D. E.**
CAMAC based inter-computer communications system
[DE82-002879] p 156 N83-16233
- GREER, R. T.**
Microstructure of coal p 87 N83-10576
- GREGORY, A. R.**
Geologic studies of geopressured and hydrogeopressured zones in Texas Test well site selection
[PB82-220542] p 94 N83-11653
- GREGORY, J. A.**
Hydrogenated a-Si₃N₄/Ge_{1-x}/ - A potential solar cell material p 34 A83-15871
- GREGORY, L. J.**
Fluidized-bed pyrolysis of oil shale Oil yield, composition, and kinetics
[DE82-021010] p 97 N83-12571
- GRESCH, H.**
Reconstruction and testing of the flue gas desulfurizing plant Weiher 2
[BMFT-FB-T-82-108] p 91 N83-10652
- GRETTON-WATSON, P.**
Case for a Space Center in the Arabian Gulf p 2 A83-18812
- GRETZ, J.**
Solar thermal electricity generation - EURELIOS, the 1 MW_{el}/ heliostatic power plant of the European communities p 24 A83-11802
- GRIFFIN, J.**
Urban waste as a potential source for brick plants p 88 N83-10591
- GRIFFITH, W. L.**
Chemicals enhanced oil recovery
[DE82-003475] p 105 N83-14206
- GRIFFITHS, J. C.**
Commercialization of a pulse combustion furnace with ultrahigh efficiency
[PB82-243809] p 12 N83-13217
- GRIGSBY, R. D.**
Automated probe microdistillation/mass spectrometry for the analysis of high-molecular weight compounds in fossil fuels
[PB82-022039] p 95 N83-12202
- GRIMES, P.**
Parametric behavior of the circulating zinc-bromine battery
[DE82-001910] p 167 N83-14759
- GRINDSTAFF, G. G.**
Automated probe microdistillation/mass spectrometry for the analysis of high-molecular weight compounds in fossil fuels
[PB82-022039] p 95 N83-12202
- GRINGEL, D.**
A family of thin high efficiency silicon solar cells p 62 N83-14703
- GROLL, M.**
Transient shutdown of an axial-groove liquid trap heat pipe thermal diode p 157 A83-19161
- GRONET, C. M.**
Design of a 13% efficient n-GaAs_{1-x}/P_x/x/ semiconductor-liquid junction solar cell p 36 A83-17801
- GROSJEAN, C. C.**
On the formula for the upper limit of photovoltaic solar energy conversion efficiency p 23 A83-10699
- GROSS, B.**
Equidensitometrical evaluation of a film record of an SF₆ switching arc p 153 N83-16136
- GROSS, J.**
Dry processing of power plant coal rich in inerts
[BMFT-FB-T-82-101] p 90 N83-10631
- GROSS, R. J.**
An experimental study of single medium thermocline thermal energy storage
[ASME PAPER 82-HT-53] p 26 A83-12800
- GROSSMAN, G.**
An experimental investigation of a stationary reflector/tracking absorber solar collector at intermediate temperatures p 27 A83-13479
- GROT, R. A.**
Thermal infrared sensing applied to energy conservation in building envelopes /Thermosense IV/, Proceedings of the Meeting, Ottawa, Ontario, Canada, September 1-4, 1981 p 2 A83-12686
- GRUETER, J. W.**
Prototype solar house Study of the scientific evaluation and feasibility of a research and development project
[BMFT-FB-T-82-137] p 49 N83-11598
- GRUHL, J.**
Alternative electric generation impact simulator
[PB82-180324] p 3 N83-10302

- GRZYNSKI, M.**
Fusion at counterstreaming ion beams Ions Optic Fusion (IOF) p 151 N83-16124
- GUAY, P. J.**
Evaluation of the Kioswall longwall mining system
[DE82-015881] p 89 N83-10606
- GUBBINS, K. E.**
Computer simulation and molecular theory studies of natural gas mixtures
[PB82-22060] p 92 N83-11349
- GUDKOV, V. I.**
Thermal energy storage units for solar electric power plants p 31 A83-15132
- GUERRA, C. R.**
Sewage sludge as a supplementary utility boiler fuel p 88 N83-10590
- GUINN, V. P.**
Geochemical studies of cores from the San Juan Basin Research Site, Grants Uranium Region, New Mexico
[DE82-004153] p 108 N83-14795
- GUNSALLUS, C. T.**
Design and fabrication of composite blades for the Mod-1 wind turbine generator
[NASA-CR-167987] p 128 N83-11579
- GUNTERMANN, K.**
Pressure-swinging underground gasification Theoretical and experimental investigations of gasification, phase 2
[BMFT-FB-T-82-066] p 89 N83-10615
- GUPTA, B.**
Thermionically emitting copper cathode in contact with combustion plasmas p 116 A83-16101
- GUTIERREZ, C.**
Oxygen evolution improvement at a Cr-doped SrTiO₃ photoanode by a Ru-oxide coating p 33 A83-15493
- GUYER, T.**
Analysis of defect structure in silicon Characterization of samples from UCP ingot 5848-13C
[NASA-CR-169617] p 60 N83-14680
- GUYOT, P.**
ARABSAT solar array p 66 N83-14733
- GWINN, D. A.**
Lower-hybrid-heating experiments on the Alcator C and the Versator II Tokamaks
[DE82-013674] p 132 N83-13007
- GYATT, G.**
The dynamic inducer as a cost-effective wind turbine system p 118 A83-18457

H

- HAAKINSON, E. J.**
Instrument landing system localizer receiver performance in the presence of co-channel interference
[AD-A118909] p 99 N83-13089
- HAAR, W.**
Development of the sodium/sulfur batteries, phase 2
[BMFT-FB-T-82-142] p 162 N83-11599
- HAAS, J. E.**
Cold-air performance of compressor-drive turbine of Department of Energy upgraded automobile gas turbine engine 2 Stage performance
[NASA-TM-82818] p 127 N83-11063
- HABIB-AGAH, H.**
Resource targets for advanced underground coal extraction systems
[NASA-CR-169429] p 85 N83-10503
- HACKETT, K. E.**
Lower hybrid RF current drive and electron-cyclotron heating on the Versator 2 Tokamak
[DE82-017127] p 125 N83-10934
- HADLEY, D. L.**
Second-cyclotron-harmonic emission measurements on ISX-B
[DE82-009938] p 126 N83-10949
- HADDAD, R.**
Geochemical studies of cores from the San Juan Basin Research Site, Grants Uranium Region, New Mexico
[DE82-004153] p 108 N83-14795
- HADLEY, D. L.**
Candidate wind-turbine-generator site Data summary
[DE82-020416] p 99 N83-12785
- HAGEN, D. L.**
Design of plywood and paper flywheel rotors p 165 N83-14662
- HAGEN, L. J.**
Darneus wind-turbine and pump performance for low-lift irrigation pumping
[DE82-016270] p 131 N83-12564
- HAGLUND, R. A.**
Dish Stirling system integration and test progress report p 44 N83-10539
- HAIDER, G.**
Catalytic hydrodeoxygenation of coal-derived liquids and related oxygen-containing compounds p 81 N83-10132
- HALBOUTY, M. T.**
Applications of remote sensing to petroleum exploration p 77 A83-10030
- HALL, I. J.**
Black chrome solar selective coatings optimized for high temperature applications p 33 A83-15479
- HALL, J. C.**
Spectroscopic studies of the hazards of Li/SOCl₂ batteries during anode-limited cell reversal p 114 A83-12056
- HALL, M. R.**
Studies leading to the development of high-rate lithium-sulfuryl chloride battery technology
[AD-A120853] p 146 N83-15901
- HALL, R. J.**
Studies leading to the development of high-rate lithium sulfuryl chloride battery technology
[AD-A120002] p 146 N83-15907
- HALL, M. R.**
Flat plate photovoltaic power systems Description, design and cost
[AD-A120814] p 73 N83-15902
- HALL, R. J.**
Remote sensing applications to the development of an integrated data base for oil and gas exploration p 107 N83-14628
- HALLEN, R. T.**
Kinetics and catalysis of producing synthetic gases from biomass
[PB82-214347] p 82 N83-10156
- HALMANN, M.**
Polycrystalline lanthanum rhodate and lutetium rhodate photoelectrodes for liquid junction solar cells p 33 A83-15480
- HALPERT, G.**
Lithium/sulfur dioxide cell and battery safety
[NASA-RP-1099] p 135 N83-14684
- HAMAKAWA, Y.**
Recent progress of amorphous-silicon solar-cell technology in Japan p 24 A83-11803
- HAMAKAWA, Y.**
Valency control of glow discharge produced a-SiC:H and its application to heterojunction solar cells p 28 A83-13649
- HAMAKAWA, Y.**
Recent advances in amorphous silicon solar cells p 34 A83-15510
- HAMILTON, G. W.**
Designs of tandem-mirror fusion reactors
[DE82-000845] p 138 N83-15134
- HAMILTON, H. B.**
Losses in chopper-controlled DC series motors
[NASA-CR-167845] p 133 N83-13359
- HAMLIN, H. S.**
Geologic studies of geopressured and hydrogeopressured zones in Texas Test well site selection
[PB82-220542] p 94 N83-11653
- HAMMER, J. H.**
Analytical and numerical calculations of field-reversed Theta-pinch equilibria based on a generalized Hill's vortex model
[DE82-003150] p 139 N83-15139
- HAMMOND, R. P.**
Concept evaluation of automotive propulsion using liquid air/nitrogen, task 5 report p 129 N83-12439
- HANCHER, C. W.**
ANFLOW Characterization and development of an energy conserving wastewater treatment system p 4 N83-10585
- HANKINS, B. E.**
Standardization of sampling and analysis of geopressured fluids Part 2 Monitoring of geopressured wells p 82 N83-10151
- HANLON, J. A.**
Helios movable Hartmann ball
[DE82-000756] p 155 N83-16220
- HANNA, P. C.**
Fusion Energy Division automation of the ISX-B neutral beams
[DE82-016369] p 132 N83-13008
- HANUS, J.**
The optical properties of titanium nitrides and carbides Spectral selectivity and photothermal conversion of solar energy p 33 A83-15490
- HARBACH, F.**
Development of the sodium/sulfur batteries, phase 2
[BMFT-FB-T-82-142] p 162 N83-11599
- HARDER, V.**
A groundwater convection model for Rio Grande rift geothermal resources p 79 A83-11831
- HARDING, G. L.**
Rapid simulated solar absorptance measurements on flat or curved surfaces p 32 A83-15476
- HARO, M.**
A compendium of synfuel end use testing programs
[PB82-236936] p 100 N83-13279
- HARRIS, K. L.**
Computer management of geologic and petroleum data at the North Dakota Geological Survey
[DE82-904385] p 103 N83-13694

- HARRIS, P. B.**
Ambient temperature rechargeable lithium battery
[AD-A119297] p 166 N83-14742
- HARRIS, R. E.**
Cryo-cooler development for space flight applications
p 114 A83-13460
- HARRISON, T. D.**
Results of testing a development module of the second-generation E-systems concentrating photovoltaic-thermal module
[DE82-015871] p 46 N83-10598
- HART, G. W.**
Simulation of thermal aspects of residential photovoltaic systems
[DE82-020399] p 51 N83-12555
Electrical aspects of photovoltaic-system simulation
[DE82-021956] p 53 N83-12568
- HART, R. E., JR.**
The effect of different solar simulators on the measurement of short-circuit current temperature coefficients
p 70 N83-15821
Radiation damage and annealing in large area n+/p/p+ GaAs shallow homojunction solar cells
p 71 N83-15826
- HARTEN, L.**
Radial effects in heating and thermal stability of a sub-ignited Tokamak
[DE82-009384] p 124 N83-10932
- HARTMAN, J. S.**
A survey of spectral response measurements for photovoltaic devices
[DE82-006221] p 50 N83-12545
- HARTMANN, B.**
Development of the sodium/sulfur batteries, phase 2
[BMFT-FB-T-82-142] p 162 N83-11599
- HARVEY, R. W.**
Analysis of treated sludges and associated leachates from coal-conversion facilities
[DE82-001488] p 103 N83-13650
- HASENAUER, D.**
Development of the sodium/sulfur batteries, phase 2
[BMFT-FB-T-82-142] p 162 N83-11599
- HASLETT, B.**
Thermal management of large pulsed power systems
p 145 N83-15889
- HATZIPROKOPIOU, M. E.**
External ionization mechanisms for advanced thermionic converters
p 120 N83-10496
- HAU, E.**
Stationary flywheel energy storage systems
[PB82-238130] p 165 N83-13637
- HAUG, A.**
Simple anemometer for wind classification
[BMFT-FB-T-82-106] p 92 N83-10719
- HAUGER, J. S.**
Verification testing of the PKI collector at Sandia National Laboratories, Albuquerque, New Mexico
p 43 N83-10534
PKI solar thermal plant evaluation at Capitol Concrete Products, Topeka, Kansas
p 43 N83-10535
- HAUGH, J. R.**
Arctic terrestrial environmental research programs of the Office of Energy Research, Department of Energy: Evaluation and recommendations. Appendix A. Terrestrial environmental research in Alaska during 1980-1981
[PB82-197096] p 9 N83-11633
- HAUSER, S. G.**
Evaluation of solar-air-heating central-receiver concepts
[DE82-016924] p 48 N83-11586
- HAUTH, D. C.**
Industrial energy use, annual report for 1979 - 1980
[PB82-200585] p 11 N83-12590
- HAVES, P.**
Development of the trickle roof cooling and heating system. Experimental plan
[DE82-019082] p 57 N83-13615
- HAWLEY, M.**
Measurements of energy distribution and thrust for microwave plasma coupling of electrical energy to hydrogen for propulsion
[AIAA PAPER 82-1951] p 75 A83-12508
- HAY, J. E.**
Evaluation of a sheathed permissible explosive charge for open shooting in flammable atmospheres. Adobe charge program
[PB82-220732] p 103 N83-13636
- HAYASHI, Y.**
Changes in photovoltaic and dark electrical properties of hydrogenated amorphous silicon diodes induced by forward bias carrier injection
p 34 A83-16021
- HAZARD, H. R.**
Potential for use of peat blends with coal for electrical power generation
[DE82-003634] p 110 N83-15497
- HAZELTINE, R. D.**
Radial guiding-center drifts and omnigenity in bumpy-torus confinement systems
[DE82-019802] p 135 N83-14000
- HAZLETT, R. N.**
Pyrolysis of organic compounds containing long unbranched alkyl groups
[AD-A119749] p 104 N83-14165
- HEALY, T. J.**
Rocky Flats small wind systems program. An update
p 146 N83-15912
- HEDEMANN, M. A.**
Measurements of magnetic field fluctuations in the Caltech research Tokamak
p 124 N83-10925
- HEDGES, R. O.**
Helios movable Hartmann ball
[DE82-000756] p 155 N83-16220
- HEGEDUS, L. S.**
Liquid phase thermochemical energy conversion systems - An application of Diels-Alder chemistry
p 118 A83-17149
- HEGLER, B. E.**
Advances in energy technology; Proceedings of the Eighth Annual UMR-DNR Conference on Energy, University of Missouri-Rolla, Rolla, MO, November 4-7, 1981
p 169 A83-17115
- HEIDER, K.**
Solar energy conversion based on the principle of fluorescent collectors
[BMFT-FB-T-82-081] p 47 N83-10621
- HEIDMAN, J. A.**
Technology assessment of anaerobic systems for municipal wastewater treatment. Part 1. Anaerobic fluidized bed. Part 2. ANFLOW
[PB82-229170] p 17 N83-13670
- HEIMKE, G.**
Production technology of an electrolyte for Na/S batteries
[BMFT-FB-T-82-065] p 161 N83-10614
- HEINE, D.**
Investigation of heat storage for temperature range from 200 to 500 C
[BMFT-FB-T-82-105] p 161 N83-10627
- HEINRICH, F.**
SFW-Funk process for gasification of solid urban and industrial waste
[BMFT-FB-T-82-117] p 16 N83-13651
- HEISEY, J. B.**
Performance and emissions characteristics of aqueous alcohol fumes in a DI diesel engine
[NASA-CR-167917] p 96 N83-12250
- HELLWIG, U.**
Investigation of extracts by fluidized bed extraction
[BMFT-FB-T-82-068] p 81 N83-10142
- HEMPHILL, R. R.**
Television interference and acoustic emissions associated with the operation of the Darneus VAWT
p 149 N83-15934
- HENDRON, R. H.**
Power from the hot-dry-rock geothermal resource
[DE82-000759] p 107 N83-14750
- HENEIN, N. A.**
Sensitivities of internal combustion automotive engines to variations in fuel properties
[PB82-194961] p 84 N83-10430
- HENISCH, H. K.**
Schottky revisited
p 34 A83-15509
- HENNEMANN, B.**
Thermochemical heat storage. State-of-the-art report
[PB82-188087] p 162 N83-11610
- HENNET, J.-C.**
A methodology of evaluation and design of fields of focusing heliostats
p 24 A83-11768
- HENNON, G. J.**
An economic and engineering analysis of the full-scale trommel screen operations at Baltimore County, Maryland
p 87 N83-10581
- HENRICKS, L. L.**
Spectroscopic studies of the hazards of Li/SOCl₂ batteries during anode-limited cell reversal
p 114 A83-12056
- HEPEL, M.**
Thermodynamics and photoelectrochemical behavior of the n-TiO₂ electrode in fluoride containing solutions
[AD-A119144] p 58 N83-14179
- HEPEL, T.**
Thermodynamics and photoelectrochemical behavior of the n-TiO₂ electrode in fluoride containing solutions
[AD-A119144] p 58 N83-14179
- HERLING, A. M.**
Power conditioning subsystem design
[AD-A117736] p 121 N83-10569
- HERMAN, H.**
Wildcat: A catalyzed D-D Tokamak reactor
[DE82-013712] p 125 N83-10938
- HERMANN, A. M.**
Luminescent solar concentrators - A review
p 28 A83-13581
Diffusion length measurements in solar cells: An analysis and comparison of techniques
p 69 N83-15812
- HERSH, H. N.**
Optimal sizing of heating systems that store and use thermal energy
[DE82-003011] p 164 N83-13609
Field evaluation and assessment of thermal energy storage for residential space heating
[DE82-000164] p 168 N83-15949
- HERZ, J.**
Analysis of small commercial photovoltaic applications
[DE82-020924] p 51 N83-12548
- HERZOG, F.**
Safety data for small wind systems
[DE82-015400] p 131 N83-12565
- HEYMANN, P.**
Dynamics of ionization and transport in a magnetically confined plasma column
p 153 N83-16132
- HIBBS, B.**
Optimization of the dynamic inducer wind turbine system
p 150 N83-15940
- HICKS, H. R.**
Rippling modes in the edge of a Tokamak plasma
[DE82-007724] p 125 N83-10940
Resistive MHD studies of high-beta Tokamak plasmas
[DE82-008101] p 126 N83-10942
Resistive MHD studies of high-beta-Tokamak plasmas
[DE82-001478] p 139 N83-15141
- HIGGINBOTHAM, E. B.**
Environmental assessment of stationary source NO_x control technologies
[PB82-249350] p 16 N83-13665
- HILL, F. B.**
Hydrogen recovery from supplemented natural gas by metal hydrides
[DE82-002245] p 76 N83-14303
- HILL, H.**
NASA solar array flight experiment
p 65 N83-14722
- HILL, R.**
The properties and production of solar cells
p 35 A83-16183
- HINO, T.**
The solar assisted air-source heat pump system, part 1
[PB82-218439] p 39 N83-10286
- HINTON, F. L.**
Stabilization of axisymmetric mirror plasma by energetic ion injections
[DE81-030341] p 155 N83-16229
- HINTZE, W.**
Numerical simulation of collective ion acceleration
p 152 N83-16127
- HIRSHMAN, S. P.**
Curvilinear coordinates for magnetic confinement geometries
[DE82-019733] p 124 N83-10928
- HIVELY, L. M.**
Fusion reactor plasma-performance modeling. POPCON analysis
[DE82-016364] p 126 N83-10943
- HMURCIK, L.**
Heat-treatment studies on thin-film CdS/Cu_x/S solar cells
p 35 A83-16064
- HO, F.**
Recent developments in thin silicon solar cells
p 68 N83-15809
- HOAG, J. H.**
Resource targets for advanced underground coal extraction systems
[NASA-CR-169429] p 85 N83-10503
- HOAGLAND, J. R.**
An integrated model for the natural flow regime in the Cerro Prieto hydrothermal system, B.C., Mexico, based upon petrological and isotope geochemical criteria
[DE82-001980] p 107 N83-14658
- HOARD, R. W.**
Utilizing subcooled, superfluid He-II in the design of a 12-Tesla tandem-mirror experiment
[DE82-003322] p 138 N83-15133
- HOBBIE, J. E.**
Effects of oil on tundra ponds and streams
[DE82-018899] p 15 N83-13649
- HOCK, S.**
Wind-energy program. FY 1982 third quarterly review
[DE82-019928] p 133 N83-13714
- HOCKING, G.**
Data report for the Southwest Residential Experiment Station, Mar 1982
[DE82-020400] p 52 N83-12556

HODGE, R. C.

- HODGE, R. C.**
Design and development of a high-concentration photovoltaic concentrator
[DE82-015673] p 46 N83-10597
- HODGETT, D.**
Thermochemical heat storage State-of-the-art report
[PB82-188087] p 162 N83-11610
- HOEFFGEN, H.**
Steam generator with circulating atmospheric fluidized bed combustion
[BMFT-FB-T-82-134] p 94 N83-11596
- HOEFLE, P.**
Diesel driven low capacity heat pump for heating and hot water production
[BMFT-FB-T-82-128] p 7 N83-11592
- HOEHLER, B.**
Experiments on the ADAM 1 plant for the optimisation of methanization process in the long distance nuclear energy transmission system test run performed in the spring of 1980
[BLT-TS869/BG/MRS14614/82] p 85 N83-10495
- HOENIG, C. L.**
Synroc processing options
[DE82-004230] p 17 N83-13976
- HOFFMAN, A.**
Performance criteria for photovoltaic energy systems, volume 1
[DE82-021958] p 56 N83-13596
Performance criteria for photovoltaic energy systems, volume 2
[DE82-021683] p 56 N83-13597
- HOFFMAN, H. J.**
Field ionization of deep levels in semiconductors with applications to Hg/1-x/Cd/x/ Te p-n junctions
p 156 A83-16089
- HOFMANN, F.**
Reconstruction and testing of the flue gas desulfurizing plant Weiher 2
[BMFT-FB-T-82-108] p 91 N83-10652
- HOGAN, S.**
Commercial Photovoltaics Measurements Workshop, Vail, CO, July 27-29, 1981, Proceedings
p 32 A83-15452
Performance criteria for photovoltaic energy systems, volume 1
[DE82-021958] p 56 N83-13596
Performance criteria for photovoltaic energy systems, volume 2
[DE82-021683] p 56 N83-13597
- HOGUE, F. E.**
Experimental feasibility of the airborne measurement of absolute oil fluorescence spectral conversion efficiency
p 169 A83-18581
- HOHENEMSER, K. H.**
Atmospheric testing of a two bladed full controlled wind turbine with passive cyclic pitch variation
p 149 N83-15938
- HOLIK, H.**
Air circuit with heat pump
[PB82-221219] p 18 N83-14312
- HOLLY, D. J.**
Polaroid ohmic heating in a multipole
[DE82-019888] p 134 N83-13998
- HOLME, O. A. M.**
Aerodynamic analysis of horizontal axis wind turbines
p 130 N83-12530
- HOLMES, D. E.**
Advances in large-diameter liquid encapsulated Czochralski GaAs
p 70 N83-15819
- HOLMES, D. L.**
Flat plate photovoltaic power systems Description, design and cost
[AD-A120814] p 73 N83-15902
- HOLMES, J. A.**
Resistive MHD studies of high-beta Tokamak plasmas
[DE82-008101] p 126 N83-10942
Resistive MHD studies of high-beta-Tokamak plasmas
[DE82-001478] p 139 N83-15141
- HONAN, A. J.**
Aerodynamic platform companion for jet-stream electricity generation
p 116 A83-16102
- HONG, J. H.**
Phase equilibrium studies for methane/synthesis gas separation. The hydrogen-carbon monoxide-methane system
[PB82-200637] p 95 N83-12208
- HOPKINS, G. R.**
Prospects of low-activation fusion-reactor design
[DE82-003198] p 155 N83-16231
- HOPKINS, R. H.**
Large-area sheet task advanced dendritic web growth development
[NASA-CR-169624] p 58 N83-14665
Large-area sheet task advanced dendritic web growth development
[NASA-CR-169639] p 59 N83-14669

PERSONAL AUTHOR INDEX

- Large-area sheet task advanced dendritic web growth development
[NASA-CR-169637] p 59 N83-14675
- HOR, A.-M.**
Photovoltaic properties of cadmium sulfide/trivalent-metal phthalocyanine heterojunction devices
p 39 A83-19259
- HORN, R. D.**
Computer-simulation code for the prediction of reliability and available capacity of modular energy-storage arrays. Volume 1 Overview
[DE82-906445] p 164 N83-13618
- HORNER, M. W.**
Development of high temperature turbine subsystem technology to a technology readiness status, phase 2
[DE82-003222] p 129 N83-12437
- HORTON, J. R.**
Modification of feed/effluent flow work exchangers for slurry service and power recovery in coal liquefaction processes
[DE82-004114] p 110 N83-15499
- HORVATH, E.**
Transformation of wind energy by a high-altitude power plant
p 117 A83-16112
- HOSHINO, H.**
An experimental study of an aerodynamically optimum windmill
[NAL-TR-698] p 129 N83-12522
- HOUGHTON, J. C.**
Estimation of resource and reserves
[PB82-230954] p 103 N83-13631
- HOULBERG, W. A.**
Fusion reactor plasma-performance modeling POPCON analysis
[DE82-016364] p 126 N83-10943
Neutral-beam deposition in large, finite-beta noncircular Tokamak plasmas
[DE82-008146] p 127 N83-10957
Computational methods in Tokamak transport
[DE82-016616] p 132 N83-13006
- HOWARD, B. D.**
Kali Home, Long Island, New York. Solar-energy-system performance evaluation, Sep 1981-Mar 1982
[DE82-021701] p 50 N83-12539
- HRUSKA, J.**
Development of current sheath on output of coaxial gun
p 152 N83-16125
- HSIAO, C.-K.**
Photovoltaic properties of cadmium sulfide/trivalent-metal phthalocyanine heterojunction devices
p 39 A83-19259
- HSU, P. Y.**
Methods to enhance blanket power density
[DE82-017467] p 127 N83-10958
- HUANG, D. T. J.**
Hydrogen recovery from supplemented natural gas by metal hydrides
[DE82-002245] p 76 N83-14303
- HUDSON, C. L.**
Vehicle characterization for the TAPCUT Project Performance and cost
[DE82-019772] p 13 N83-13465
- HUFF, J. R.**
Application of fuel cells to highway and nonhighway transportation
[DE82-004365] p 156 N83-16259
- HUFFMAN, F.**
Thermionic technology for spacecraft power Progress and problems
p 145 N83-15887
- HUGGINS, R. A.**
Electrolytic deposition of low-cost, high-purity polysilicon suitable for use in solar-cell devices
[DE82-012428] p 51 N83-12552
- HUMMELSIEP, H.**
SFW-Funk process for gasification of solid urban and industrial waste
[BMFT-FB-T-82-117] p 16 N83-13651
Measuring program for the R and D project on gasification of domestic and industrial wastes
[BMFT-FB-T-82-118] p 16 N83-13652
- HUMPHREY, J. A. C.**
Investigation of free-forced convection flows in cavity-type receivers
[DE82-020118] p 49 N83-12386
- HUMRICH, U.**
Development of the sodium/sulfur batteries, phase 2
[BMFT-FB-T-82-142] p 162 N83-11599
- HUSS, E. B.**
Fluidized-bed pyrolysis of oil shale Oil yield, composition, and kinetics
[DE82-021010] p 97 N83-12571
- HUSS, G.**
Stationary flywheel energy storage systems
[PB82-238130] p 165 N83-13637

- HUSSMANN, E.**
Development of large scale production methods for components of solar energy collection Transparent glass covers and their connection to the collector system
[BMFT-FB-T-82-083] p 47 N83-10622
Flat plate solar collectors
[BMFT-FB-T-82-139] p 68 N83-14764
- HUTCHINSON, D. P.**
Faraday-rotation measurements in ISX-B
[DE82-011507] p 127 N83-10953
- HWANG, C. S.**
Automated probe microdistillation/mass spectrometry for the analysis of high-molecular weight compounds in fossil fuels
[PB82-022039] p 95 N83-12202
- HYATT, J.**
Secondary battery requirements for space use in the late 1980's/1990's
[HL82/1200] p 165 N83-13627
- HYLANDER, J.**
Some methods to connect a windpower induction generator to the utility network
[DE82-750057] p 133 N83-13372
- IGELBUESCHER, H.**
Reconstruction and testing of the flue gas desulfurizing plant Weiher 2
[BMFT-FB-T-82-108] p 91 N83-10652
- IKE, C.**
Urban waste as a potential source for brick plants
p 88 N83-10591
- IKEGAMI, H.**
Non-circular bumpy torus
[IPPJ-607] p 134 N83-13990
- ILES, P.**
Recent developments in thin silicon solar cells
p 68 N83-15809
- IMAI, H.**
Mass balance on the arc mode seed electrodes
p 154 N83-16211
- IMHAUSEN, K. H.**
The joint Australia/Federal Republic of Germany feasibility study on the conversion of Australian coals into liquid fuels in Australia
[BMFT-FB-T-82-133] p 94 N83-11595
- INAL, O. T.**
An investigation of deposition parameter dependence of optical properties, microstructure and thermal stability of black chrome selective surfaces
p 34 A83-15497
- IRGOLIC, K. J.**
Basic Research Opportunities for Lasting Fuel Gas Supplies from Inorganic Resources. Report of a Workshop College Station, 8 Jun - 14 Aug. 1981
[PB82-231671] p 101 N83-13284
- IRISAWA, T.**
Welding of AL-MG alloy 5083-0 for the construction of LNG storage tanks
p 93 N83-11500
- ISHIDA, Y.**
An experimental study of an aerodynamically optimum windmill
[NAL-TR-698] p 129 N83-12522
- ISHIKAWA, M.**
Three-dimensional current distribution in coal-fired MHD channels
[DE82-016958] p 99 N83-13005
- ISHIMURA, T.**
Analysis of stabilization effect of quadrupole field on theta pinch plasmas
[IPPJ-608] p 131 N83-12995
- JACOBSON, R. A.**
Rapid analysis of mineral content of coal Development of an on-line monitoring instrument for pyrite and ash in coal
p 88 N83-10571
- JAEGER, H.**
Research and development on a MIS thin film solar cell made of amorphous silicon
[BMFT-FB-T-82-079] p 47 N83-10620
- JAEGEL, E. K.**
Space Telescope Solar panel assembly thermal test analysis
p 65 N83-14724
- JAKUB, A.**
Antimisting kerosene atomization and flammability
[NASA-CR-169385] p 95 N83-12246
- JAKUBKA, K.**
Lower-hybrid heating experiment on the TM-1-MH Tokamak
p 150 N83-16116
Energy balance in TM-1-MH Tokamak (ohmic heating)
p 151 N83-16122

PERSONAL AUTHOR INDEX

KENNA, J. P.

JALUFKA, N. W.
Radiation-driven MHD systems for space applications
p 144 N83-15867

JAMEEL, M.
Energy for agriculture in Pakistan
[IIASA-RR-82-20] p 3 N83-10499

JAMES, G. W.
Airline economics p 2 A83-14000

JANKOVIC, T.
Development of the trickle roof cooling and heating system. Experimental plan
[DE82-019082] p 57 N83-13815

JANOJA, J.
Coating of laser fusion targets by plasma polymerized organic thin films p 152 N83-18126

JASTI, J. K.
Advanced regenerative heat recovery system
[PB82-200650] p 8 N83-11604

JAUMOTTE, A.
The rebirth of the Rankine cycle - Energy production on the basis of low- and medium-temperature heat sources p 113 A83-11868

JAWOROWSKI, Z.
Population hazards resulting from the combustion of fossil fuels and the nuclear power industry
[BLL-RISLEY-TR-4173-9091 9] p 11 N83-12594

JENKINS, J. P.
A comparison of unglazed flat plate liquid solar collector thermal performance using the ASHRAE Standard 96-1980 and modified BSE test procedures
[PB82-237660] p 58 N83-13632

JENSEN, R. J.
Laser-isotope-separation technology
[DE81-030114] p 104 N83-14197

JENSEN, R. N.
NECAP 4.1 NASA's Energy-Cost Analysis Program fast input manual and example
[NASA-TM-83241] p 4 N83-10566

JHIRAD, D. J.
Harnessing the Sun for development Actions for consideration by the international community at the UN Conference on New and Renewable Sources of Energy for promoting the use of renewable energy in developing countries
[DE82-020273] p 52 N83-12558

JIRIK, L. A.
Geologic studies of geopressured and hydropressured zones in Texas: Test well site selection
[PB82-220542] p 94 N83-11653

JOBE, T. L., JR.
Thermodynamic data for desulfurization processes
[PB82-184904] p 95 N83-12207

JOHNSON, C.
Refining of military jet fuels from shale oil Part 1 Preliminary process design, economic and yield optimization, and computer modeling
[AD-A117511] p 83 N83-10210

JOHNSON, D. L.
Pulsed power for inertial-confinement fusion
[DE82-001991] p 137 N83-15116

JOHNSON, D. W.
Effects of acid precipitation on elemental transport from terrestrial to aquatic ecosystems
[DE82-002739] p 20 N83-14778

JOHNSON, G. K.
Develop and test fuel cell powered on-site integrated total energy system
[NASA-CR-168020] p 140 N83-15839

JOHNSON, J.
Evaluation of short-term NO₂ plume models for point sources. Volume 1 Technical discussion
[PB82-234329] p 16 N83-13658

JOHNSON, J. S., JR.
Chemicals enhanced oil recovery
[DE82-003475] p 105 N83-14206

JOHNSTON, B. M.
Designs of tandem-mirror fusion reactors
[DE82-000845] p 138 N83-15134

JOHNSTON, R. P.
Energy efficient engine. Flight propulsion system preliminary analysis and design
[NASA-CR-159859] p 9 N83-12094

JONCICH, D. M.
Overview of passive solar design techniques
[AD-A119993] p 73 N83-15899

JONES, G. D.
Impact of NO_x selective catalytic reduction processes on flue gas cleaning systems
[PB82-240086] p 16 N83-13664

JONES, G. J.
Central-station applications. System and subsystem research activities p 40 N83-10511

JONES, G., II
Projected temperature dependence of quantum yields for photoreactions involving energy or electron transfer p 37 A83-18559

JONES, R. M.
Chemicals enhanced oil recovery
[DE82-003475] p 105 N83-14206

JONES, W. M.
Use of oxide decompositions in advanced thermochemical hydrogen cycles for solar heat sources Experimental results on the low-temperature reactions for the tricobalt tetroxide-cobalt monoxide pair
[DE82-002390] p 77 N83-15958

JORDAN, A. G.
Stability of SnO₂ thin films used for photovoltaic devices p 38 A83-18563

JORDAN, J.
Development of instrumental methods of analysis of sulfur compounds in coal process streams
[DE82-003253] p 108 N83-14775

JORDAN, J.
Development of instrumental methods of analysis of sulfur compounds in coal-process streams
[DE82-003291] p 20 N83-14776

JOST, M.
Pulverized coal combustion
[DE82-002969] p 105 N83-14198

JOYCE, T. J.
Assessment of research and development needs for methane fueled engine systems
[PB82-199035] p 97 N83-12257

JUDD, D. L.
Accelerator and fusion research division
[DE82-012361] p 124 N83-10930

JUDKINS, R. R.
Corrosion in fractionation systems
[DE82-001441] p 109 N83-15427

JUETTNER, B.
Crater formation by high current discharges in vacuum p 152 N83-18129

JUHASZ, A. J.
Methods of reducing energy consumption of the oxidant supply system for MHD/steam power plants
[AIAA PAPER 83-0468] p 118 A83-16735

JUHASZ, A. J.
Methods of reducing energy consumption of the oxidant supply system for MHD/steam power plants
[NASA-TM-83025] p 133 N83-13589

JUNG, J.
Wildcat. A catalyzed D-D Tokamak reactor
[DE82-013712] p 125 N83-10938

JUNG, J.
Laboratory research for desulfurizing and NO-reduction by addition of ammonia under the conditions of the Bergbau-Forschung flue gas desulfurizing process
[BMFT-FB-T-82-147] p 9 N83-11617

JUNGWIRTH, K.
Computer simulations of reflex E-beam systems and plasma stability p 151 N83-18123

JURY, E.
Improvement of electrostatic precipitators performance through conditioning by flue gas
[BMFT-FB-T-82-123] p 20 N83-14783

K

KACHANOVSKII, M. N.
Investigation of the equations of motion of the heliostats of a tower-type solar electric power plant p 31 A83-15133

KACHARE, A. H.
Advanced Czochralski silicon growth technology for photovoltaic modules
[NASA-CR-169661] p 61 N83-14685

KAHN, Z.
Investigation of engineering and design considerations in selecting conveyors for densified Refuse-Derived Fuel (dRDF) and dRDF Coal mixtures
[AD-A119065] p 107 N83-14495

KAIER, U.
Utilization of the waste heat of a steel work
[BMFT-FB-T-82-135] p 8 N83-11597

KAKABAEV, A.
Regulation of the diurnal variation of the cold productivity of an adsorption-type solar refrigeration system p 31 A83-15135

KALWAR, K.
Absorption type water chiller fired directly by waste heat
[BMFT-FB-T-82-129] p 7 N83-11593

KAMATH, G. S.
GaAs solar cells for concentrator systems in space p 70 N83-15820

KAMIMURA, T.
Non-circular bumpy torus
[IPPJ-607] p 134 N83-13990

KANNBERG, L. D.
Advanced concepts: The second generation of compressed air-energy storage technology
[DE82-003838] p 167 N83-14755

KANT, M.
On the optimization of magnetic field sources in electromechanical energy conversion p 112 A83-10641

KANTNER, E.
Parametric behavior of the circulating zinc-bromine battery
[DE82-001910] p 167 N83-14759

KAPLAN, C. P.
Industrial energy use, annual report for 1979 - 1980
[PB82-200585] p 11 N83-12590

KAPLAN, I.
Geochemical studies of cores from the San Juan Basin Research Site, Grants Uranium Region, New Mexico
[DE82-004153] p 108 N83-14795

KAPOOR, V. J.
Planar multijunction high voltage solar cell chip p 30 A83-13923

KARATAS, C.
Catalytic liquefaction of biomass
[DE82-003329] p 108 N83-14752

KARGER, R.
Basic engineering of a 10 t/hr prototype plant for the Vereinigte Elektrizitätswerke Westfalen (VEW) coal conversion process
[BMFT-FB-T-82-114] p 101 N83-13378

KARKALITS, O. C.
Standardization of sampling and analysis of geopressured fluids Part 2. Monitoring of geopressured wells p 82 N83-10151

KARLSSON, V.
A thermal desorption cold-trap unit for gaschromatographic analysis of gaseous organic pollutants
[PB82-206368] p 3 N83-10152

KASSING, D.
Outlook for space energy systems at the end of the three-year assessment p 18 N83-14734

KASZA, K. E.
Development of enhanced heat transfer/transport/storage slurries for thermal-system improvement
[DE82-021236] p 158 N83-12387

KAUFMAN, A.
Develop and test fuel cell powered on-site integrated total energy system
[NASA-CR-168020] p 140 N83-15839

KAUFMAN, G.
Estimation of resource and reserves
[PB82-230954] p 103 N83-13631

KAWATA, S.
Sausage instability of Z-discharged plasma channel in LIB-fusion device
[IPPJ-602] p 123 N83-10917

KAWATA, S.
Analysis of target implosion irradiated by proton beam 1 Beam interaction with target plasma
[IPPJ-612] p 134 N83-13989

KEAVENY, D.
System analysis, design, construction and commission of a photovoltaic power plant for supply of broadcasting equipment
[BMFT-FB-T-82-125] p 68 N83-14783

KEHR, J.
Preliminary results of Helios solar generator inflight performance evaluation p 64 N83-14716

KEISER, J. R.
Stress-corrosion studies in coal-liquefaction environments
[DE82-001464] p 100 N83-13240

KEISER, J. R.
Corrosion in fractionation systems
[DE82-001441] p 109 N83-15427

KEIZER, C.
Absorption refrigeration machines p 156 A83-11525

KELLEHER, J. J.
Power conditioning subsystem design
[AD-A117736] p 121 N83-10569

KELLER, W. E.
Superconducting-transmission-line project at the Los Alamos National Laboratory
[DE82-021835] p 158 N83-12344

KELLEY, N. D.
Wind-energy program FY 1982 third quarterly review
[DE82-019928] p 133 N83-13714

KELLEY, N. D.
Television interference and acoustic emissions associated with the operation of the Darnes VAWT p 149 N83-15934

KELLY, M. E.
Mechanisms of dry SO₂ control processes
[PB82-196924] p 12 N83-12668

KENDALL, P. W.
Wood Road School, Ballston Spa, New York solar-energy-system performance evaluation, November 1981 - April 1982
[DE82-021301] p 54 N83-12588

KENNA, J. P.
A method of rating solar collectors p 29 A83-13701

KERBER, R.

KERBER, R.

Measurements of energy distribution and thrust for microwave plasma coupling of electrical energy to hydrogen for propulsion [AIAA PAPER 82-1951] p 75 A83-12508

KERN, E.

Rooftop applications p 40 N83-10515

KHAKIMOV, R. A.

Automatic methods for the adjustment of faceted solar-energy concentrators and heliostats p 31 A83-15131

KHALIL, A.

Conceptual design for a modular-stellarator fusion-reactor magnet [DE82-002863] p 138 N83-15135

KHAN, A. A.

Diffusion length measurements in solar cells An analysis and comparison of techniques p 69 N83-15812

KHOSHAIM, B. H.

Performance characteristics of 350 kW photovoltaic power system for Saudi Arabian villages p 28 A83-13647

KICENIUK, T.

The small community solar thermal power experiment p 43 N83-10531
Recent tests on the Carter small reciprocating steam engines p 43 N83-10536

KIDNAY, A. J.

Liquid-vapor equilibrium for ternary natural gas system [PB82-227679] p 82 N83-10160

KIDWELL, J. R.

Design of a low emission combustor for an automotive gas turbine [AIAA PAPER 83-0338] p 117 A83-16664

KIM, B. C.

Conversion of forest residues to a methane-rich gas in a high-throughput gasifier [DE82-020289] p 102 N83-13601

KIM, K. Y.

Lithium-sulfur dioxide (Li/SO₂) battery safety hazards Thermal studies [AD-A119381] p 163 N83-13591

KING, E. A.

Refractory residues, condensates and chondrules from solar furnace experiments p 31 A83-15371

KIRCHGAESSNER, B.

Static and dynamic analysis for hinged rotor blades of 60 m span for a two bladed horizontal axis wind energy converter p 130 N83-12535

KIRKPATRICK, C. G.

Advances in large-diameter liquid encapsulated Czochralski GaAs p 70 N83-15819

KIRSCH, P. A.

Development effort of Sheet Molding Compound (SMC) parabolic trough panels [DE82-000841] p 67 N83-14761

KLANN, J. L.

Assessment of alternative power sources for mobile mining machinery [NASA-TM-82695] p 136 N83-14691

KLEEMANN, M.

Prototype solar house Study of the scientific evaluation and feasibility of a research and development project [BMFT-FB-T-82-137] p 49 N83-11598

KLEIN, H. H.

Computer modeling of mixing and agglomeration in coal-conversion reactors Volume 1 Model formulation [DE82-014836] p 84 N83-10212

KLEIN, J. W.

Distributed photovoltaic systems Utility interface issues and their present status Intermediate/three-phase systems [NASA-CR-169664] p 61 N83-14686

KLIMA, R.

Short wavelength lower hybrid waves nonlinearly excited due to ponderomotive density modulation p 151 N83-16118

KLIMA, S. J.

Evaluation of electrode shape and nondestructive evaluation method for welded solar cell interconnects [NASA-TM-82966] p 45 N83-10555
Evaluation of solar cell welds by scanning acoustic microscopy p 72 N83-15834

KLIMAS, P. C.

Aerodynamics and performance testing of the VAWT [DE82-003574] p 137 N83-14760
Aerodynamics and performance testing of the VAWT p 149 N83-15933

KLIMEK, K. H.

Development, construction, and experimental operation of an improved chainless haulage system for drum-shearer loaders [BMFT-FB-T-82-102] p 158 N83-10428

KLODEN, D.

Catalytic liquefaction of biomass [DE82-003329] p 108 N83-14752

KLYSHCHAEVA, O.

Regulation of the diurnal variation of the cold productivity of an adsorption-type solar refrigeration system p 31 A83-15135

KNECHTLI, R. C.

GaAs solar cells for concentrator systems in space p 70 N83-15820

KNIAZEV, A. N.

An experimental study of fuel combustion in a high-temperature air counterflow p 79 A83-14056

KNIEL, U.

Conserving energy by improving the quality of the air purifying and air conditioning systems [BMFT-FB-T-82-067] p 6 N83-10651

KNIOLA, D. G.

Simplified solar fraction estimation for space and water heating at Department of Defense installations Appendix C Water heating nomographs [AD-A120014] p 73 N83-15904

Simplified solar fraction estimation for space and water heating at Department of Defense installations Appendix B Space heating nomographs [AD-A120013] p 73 N83-15905

Simplified solar fraction estimation for space and water heating at Department of Defense installations [AD-A120012] p 74 N83-15906

KNOWLTON, S. F.

Lower hybrid RF current drive and electron-cyclotron heating on the Versator 2 Tokamak [DE82-017127] p 125 N83-10934

KNUDSON, C. L.

Liquefaction behavior of an Australian brown coal in comparison to that of two US lignites [DE82-021977] p 95 N83-12201

KOBAYASHI, R.

Phase equilibrium studies for methane/synthesis gas separation The hydrogen-carbon monoxide-methane system [PB82-200637] p 95 N83-12208

KOCH, J.

Module technique of 5 x 5 cm(2) solar cells p 62 N83-14698
Solar arrays for small scientific satellites p 66 N83-14731

KOCH, M.

Studies leading to the development of high-rate lithium-sulfuryl chloride battery technology [AD-A120853] p 146 N83-15901

Studies leading to the development of high-rate lithium sulfuryl chloride battery technology [AD-A120002] p 146 N83-15907

KOENIG, B. A.

Low- to moderate-temperature geothermal resource assessment for Nevada Area specific studies, Pumpernickel Valley, Carlin and Moana [DE82-018598] p 98 N83-12584

KOERBEL, S.

Lower-hybrid heating experiment on the TM-1-MH Tokamak p 150 N83-16116
Power spectrum optimization of the three-waveguide grill for the T-7 Tokamak p 150 N83-16117
ANDROMEDA The system for the acquisition and numerical data processing and its application for experimental device Tokamak TM-1-MH p 151 N83-16120

Energy balance in TM-1-MH Tokamak (ohmical heating) p 151 N83-16122

KOERBER, F.

Test program for wind energy conversion system GROWIAN [BMFT-FB-T-82-072] p 128 N83-11590

KOESTER, J. K.

MHD generator research at Stanford p 142 N83-15854

KOKHOVA, I. I.

Testing of the energy module of a parabolocylindrical solar installation p 31 A83-15130

KOLACEK, K.

Apparatus for plasma electron temperature and density measurements by Thomson scattering p 153 N83-16134

KOLTUN, M. M.

Determination of the integral currents of solar cells using an improved method of spectral sensitivity measurement p 23 A83-11696

KONTONGOMDE, H.

Study of ground winds in Upper Volta. Economic and agronomic consequences for the Sudan-Sahel region of west Africa p 98 N83-12751

KOPECKY, V.

Lower-hybrid heating experiment on the TM-1-MH Tokamak p 150 N83-16116

Energy balance in TM-1-MH Tokamak (ohmical heating) p 151 N83-16122

KORENAGA, S.

Mass balance on the arc mode seed electrodes p 154 N83-16211

KORN, D. H.

Wind power for the electric-utility industry Policy incentives for fuel conservation p 1 A83-11896

KORTEGAARD, B. L.

Helios movable Hartmann ball [DE82-000756] p 155 N83-16220

KOSTANENKO, A. L.

Determination of the integral currents of solar cells using an improved method of spectral sensitivity measurement p 23 A83-11696

KOSTEK, C.

Observations of plasma rotation in the high-beta Tokamak Torus 2 [DE82-019373] p 127 N83-10952

KOTCHICK, D. M.

High-temperature ceramic heat exchanger element for a solar thermal receiver p 26 A83-13476

High-temperature ceramic heat exchanger element for a solar thermal receiver p 44 N83-10543

A high temperature ceramic heat exchanger element for a solar thermal receiver [NASA-CR-169625] p 58 N83-14666

KOTHARI, K. M.

LNG plume interaction with surface obstacles [PB82-188995] p 12 N83-12666

KOTHARI, V. S.

Industrial energy use, annual report for 1979 - 1980 [PB82-200585] p 11 N83-12590

Industrial energy use, volume 2 [PB82-200593] p 11 N83-12593

KOVARIK, M.

Universal graph for optimal dimensions of solar collector plate p 37 A83-18557

KOVBASIUK, V. I.

Computational model of a diffuse discharge on electrodes in a weakly ionized plasma p 114 A83-11952

KRAFT, M.

Tests with concentrating collectors [BMFT-FB-T-82-104] p 47 N83-10626

KRAKOWSKI, R. A.

Parametric systems analysis of the Modular Stellarator Reactor (MSR) [DE82-016244] p 126 N83-10945

ELMO Bumpy Torus fusion-reactor design study [DE82-002388] p 154 N83-16218

KRAVARIK, J.

Development of current sheath on output of coaxial gun p 152 N83-16125

KRECISZ, J.

Attempt to determine the power demand of a helicopter control system on the basis of flight tests p 1 A83-10439

KREITH, F.

An experimental investigation of a stationary reflector/tracking absorber solar collector at intermediate temperatures p 27 A83-13479

An overview of Solar Industrial Process-Heat (SIPH) applications below 120 deg C [DE82-021360] p 57 N83-13603

KRIEG, T. E.

The application of energy saving concepts to future fighter/attack aircraft design [AIAA PAPER 83-0092] p 2 A83-16516

KRIEGER, F. C.

Thermal battery systems for ordnance fuzing [AD-A119155] p 163 N83-13590

KRLIN, L.

Global model of a hybrid Tokamak reactor with an auxiliary RF heating p 153 N83-16137

KROEMER, E. J.

Development of new and improvement of existing core recovery methods [BMFT-FB-T-82-091] p 91 N83-10705

KROPP, T.

The satellite power system - Assessment of the environmental impact on middle atmosphere composition and on climate p 2 A83-14517

KRUEHLER, W. W.

Properties of amorphous silicon solar cells p 25 A83-12321

KRUGER, C. H.

Pulverized coal combustion [DE82-002969] p 105 N83-14198

MHD generator research at Stanford p 142 N83-15854

KRYSKA, L.

Lower-hybrid heating experiment on the TM-1-MH Tokamak p 150 N83-16116

- ANDROMEDA. The system for the acquisition and numerical data processing and its application for experimental device Tokamak TM-1-MH
p 151 N83-16120
- Energy balance in TM-1-MH Tokamak (ohmic heating)
p 151 N83-16122
- KUBASCO, A. J.
Combustion characteristics of hydrogen-carbon monoxide based gaseous fuels p 78 A83-11491
Combustion characteristics of hydrogen Carbon monoxide based gaseous fuels [NASA-TM-82998] p 76 N83-10560
- KUBES, P.
Development of current sheet on output of coaxial gun p 152 N83-16125
- KUEHL, M.
Technical study on the possibilities of oil shale combustion in a fluidized bed furnace including cost estimates for a plant to be built [BMFT-FB-T-82-085] p 90 N83-10623
- KULCHAR, A. G.
Second-cyclotron-harmonic emission measurements on ISX-B p 126 N83-10949
- KULCINSKI, G. L.
Fusion materials Adapting to realistic reactor environments [DE82-002708] p 138 N83-15132
- KULKARNI, S. V.
Composite-metal flywheels and containment systems p 161 N83-11017
- KUMAR, D. V.
Theory of open circuit photo-voltage in degenerate abrupt p-n junctions p 36 A83-17767
- KUNZ, H. R.
The effect of thickness on the performance of molten carbonate fuel cell cathodes p 115 A83-15869
- KUO, S.
Study of electrical faults in magnetohydrodynamic Faraday generators p 116 A83-16106
- KURIYAMA, Y.
Welding of AL-MG alloy 5083-0 for the construction of LNG storage tanks p 83 N83-11500
- KURLAND, R.
Ultralightweight solar array technology p 66 N83-14729
- KURTH, M.
Pressure-swinging underground gasification. Theoretical and experimental investigations of gasification, phase 2 [BMFT-FB-T-82-066] p 89 N83-10615
- KUSUDA, T.
Ti-59 program for calculating the annual energy requirements for residential heating and cooling. Volume 1 Users manual [DE82-010174] p 13 N83-13594
Ti-59 program for calculating the annual energy requirements for residential heating and cooling. Volume 2 Program reference manual [DE82-020275] p 13 N83-13595
- KUX, H. J. H.
Automatic interpretation of MSS-LANDSAT data applied to coal refuse site studies in southern Santa Catarina State, Brazil [E83-10068] p 18 N83-14575
- KUZELEV, M. V.
A relativistic plasma microwave generator p 115 A83-15909
- L**
- LA BLANCHETAIS, CH. H.
Prospects for the construction of solar furnaces for industry p 38 A83-19236
- LA ROTONDA, L.
A parametric analysis of the performances of a linear collectors' network of a solar power plant p 36 A83-18139
- LACINA, J.
Numerical simulation of the interaction of an electromagnetic wave with an inhomogeneous plasma p 154 N83-16140
- LAGERKVIST, O.
Durability of solar collectors. Experience from surveys of Swedish solar collector installations, 1979 - 1980 [PB82-188095] p 49 N83-11605
- LAGET, R.
ARABSAT solar array p 66 N83-14733
- LAGOWSKI, J.
Microdistribution of oxygen in silicon and its effects on electronic properties p 71 N83-15825
- LAIDRA, M.
Analytical mode for interim expansion of electrical energy generating systems [INPE-2558-TDL/104] p 129 N83-12520
- LAIRD, A. D. K.
Assessment of high heat-transfer evaporators as power plan condensers to produce abundant freshwater [PB82-188045] p 7 N83-11277
- LAIRD, D. H.
Computer modeling of mixing and agglomeration in coal-conversion reactors. Volume 1 Model formulation [DE82-014838] p 84 N83-10212
- LAKE, M.
Rapid simulated solar absorptance measurements on flat or curved surfaces p 32 A83-15476
- LAMBERGER, P. H.
Tritium waste control: October 1980 - March 1981 [DE82-002088] p 20 N83-14774
- LANE, R. L.
Advanced Czochralski ingot growth p 40 N83-10509
- LANGHALS, H.
Solar energy conversion based on the principle of fluorescent collectors [BMFT-FB-T-82-081] p 47 N83-10621
- LAO, L. L.
Computational methods in Tokamak transport [DE82-016616] p 132 N83-13006
- LAPICQUE, F.
Production of hydrogen by direct thermal decomposition of water - Preliminary investigations p 75 A83-16042
- LARIMER, F. W.
Health effects research in direct coal liquefaction. Studies of H-coal distillates. Phase 1 PDU samples, the effects of hydrotreatment [DE82-003702] p 18 N83-14302
- LARUE, J. C.
Development and testing of a spacecraft surface potential monitor p 65 N83-14718
- LARUE, R. A.
Progress toward cascade cells made by OM-VPE p 69 N83-15813
- LASTER, W. R.
Thermal energy storage testing facilities [DE82-000110] p 168 N83-15948
- LATHROP, J. W.
Investigation of reliability attributes and accelerated stress factors on terrestrial solar cells [NASA-CR-169620] p 59 N83-14670
- LATOS, T. S.
Improved SCR ac motor controller for battery powered urban electric vehicles [NASA-CR-167919] p 169 N83-16257
- LAU, T. K.
State-of-the-art of acoustic instrumentation for coal-conversion plants [DE82-004037] p 96 N83-12254
- LAVIN, M. L.
Resource targets for advanced underground coal extraction systems [NASA-CR-169429] p 85 N83-10503
- LAWLESS, J.
A survey of recent advances in and future prospects for thermionic energy conversion p 145 N83-15888
- LAWRENCE, P. F.
Corrosion tests in the Marchwood geothermal borehole [AERE-G-2225] p 112 N83-15959
- LAWSON, M. O.
An update of the electrofluid dynamics wind driven generators p 149 N83-15938
- LAYER, G.
Study of the possibilities of more rational use of energy in the sector of trade and commerce, part 1 [BMFT-FB-T-82-076-PT-1] p 5 N83-10618
Study of the possibilities of more rational use of energy in the sector of trade and commerce, part 2 [BMFT-FB-T-82-077-PT-2] p 7 N83-11591
- LAYTON, J. P.
Power conversion Overview p 145 N83-15898
- LE GOFF, P.
A project for exploitation of a new form of solar energy: the wind chill I - The importance to the energy field II - Application for building heat and electricity production p 38 A83-19238
- LEAR, W. E.
Inflow disk generator for open-cycle MHD power generation p 116 A83-16104
- LEBLANC, R.
Wind turbine blades. A study of prototypes in a steady regime - Unsteady considerations [AAAF PAPER NT 81-17] p 113 A83-11777
- LECREN, R. T.
Combustion characteristics of hydrogen-carbon monoxide based gaseous fuels p 78 A83-11491
Combustion characteristics of hydrogen Carbon monoxide based gaseous fuels [NASA-TM-82998] p 76 N83-10560
- LEDE, J.
Production of hydrogen by direct thermal decomposition of water - Preliminary investigations p 75 A83-16042
- LEDFOUR, A. E.
An oxygen flow calorimeter for determining the heating value of kilogram size samples of municipal solid waste p 87 N83-10580
- LEE, C.
Internal reforming for natural gas fueled molten carbonate fuel cells [PB82-200676] p 128 N83-11607
- LEE, C. A.
Water hyacinth wastewater treatment system p 88 N83-10586
- LEE, G. H.
Assessment/review of methanol technology and utilization as a fuel [AD-A120109] p 109 N83-15489
- LEE, J.
Development of criteria for extension of applicability of low-emission, high-efficiency coal burners [PB82-197153] p 93 N83-11377
- LEE, J. D.
Feasibility study of a fission-suppressed tandem-mirror hybrid reactor [DE82-019375] p 134 N83-13997
Designs of tandem-mirror fusion reactors [DE82-000845] p 138 N83-15134
- LEE, J. H.
Radiation-driven MHD systems for space applications p 144 N83-15867
- LEE, W.
Gasification kinetics for biomass decomposition [PB82-199043] p 97 N83-12256
- LEE, X. S.
Instabilities driven by the parallel variation of the electrostatic potential in tandem [DE82-018409] p 126 N83-10941
- LEE, Y. M.
Transient flow analysis of the AEDC/HPDE MHD generator [AIAA PAPER 83-0395] p 117 A83-16691
- LEFFEL, C. S., JR.
Geothermal community heating for Cape Charles, Virginia [PB82-184003] p 91 N83-10640
- LEIBOWITZ, H. M.
A 400-kWe high-efficiency steam turbine for industrial cogeneration p 43 N83-10537
- LEIPOLD, M. H.
Union Carbide Corp polysilicon status and plans p 40 N83-10508
- LENZ, T. G.
Liquid phase thermochemical energy conversion systems - An application of Diels-Alder chemistry p 118 A83-17149
- LEONARD, S. L.
PV large systems project p 40 N83-10512
- LERNER, M. O.
Industrial energy use, annual report for 1979 - 1980 [PB82-200585] p 11 N83-12590
Industrial energy use, volume 2 [PB82-200593] p 11 N83-12593
- LESLIE, I.
Pulverized coal combustion [DE82-002969] p 105 N83-14198
- LESTZ, S. S.
Performance and emissions characteristics of aqueous alcohol fuels in a DI diesel engine [NASA-CR-167917] p 96 N83-12250
Fumigation of alcohol in a light duty automotive diesel engine [NASA-CR-167915] p 100 N83-13272
- LEUNG, C. T.
The availability of wind energy in Hong Kong p 80 A83-14669
- LEV-ON, M.
Quality assurance in support of energy related monitoring activities [PB82-234238] p 16 N83-13657
- LEVI, E.
Study of electrical faults in magnetohydrodynamic Faraday generators p 116 A83-16106
- LEVIN, H.
Thermal reactor [NASA-CASE-NPO-14369-1] p 75 N83-10501
- LEVINE, H. B.
Computer modeling of mixing and agglomeration in coal-conversion reactors. Volume 1 Model formulation [DE82-014836] p 84 N83-10212
- LEVY, A.
CaO interactions in the staged combustion of coal [DE82-003273] p 105 N83-14205

LEVY, E. M.

- LEVY, E. M.**
Background levels and environmental cycling of petroleum hydrocarbons Multimedia monitoring requirements p 11 N83-12630
- LEVY, J.**
Economic efficiency in the sizing of residential heat pumps [PB82-179029] p 3 N83-10401
- LEVY, L.**
Development and testing of a spacecraft surface potential monitor p 65 N83-14718
- LEWIS, N. S.**
Design of a 13% efficient n-GaAs/1-x/P/x/ semiconductor-liquid junction solar cell p 36 A83-17801
- LI, S. S.**
Defects and annealing studies in 1-Me electron irradiated (AlGa)As-GaAs solar cells p 70 N83-15822
Grown-in defects and defects produced by 1-Me electron irradiated in Al_{0.3}Ga_{0.7}As P-N junction solar cells p 71 N83-15828
- LIEB, D.**
Thermionic technology for spacecraft power: Progress and problems p 145 N83-15887
- LIEBERMAN, M.**
Data report for the Southwest Residential Experiment Station, Mar 1982 [DE82-020400] p 52 N83-12556
- LIM, K. C.**
Superconducting-transmission-line project at the Los Alamos National Laboratory [DE82-021835] p 158 N83-12344
- LIM, K. J.**
Environmental assessment of stationary source NOx control technologies [PB82-249350] p 16 N83-13665
- LIN, Z.-D.**
The influence of the interface state on the properties of solar cell semiconductor electrodes p 26 A83-13473
- LIND, M. A.**
A survey of spectral response measurements for photovoltaic devices [DE82-008221] p 50 N83-12545
- LINEBERRY, J. T.**
Three-dimensional fluid and electrodynamic modeling for MHD DCW channels [AIAA PAPER 83-0464] p 117 A83-16732
- LINVILLE, B.**
Contracts for field projects and supporting research on enhanced oil recovery and improved drilling technology [DE82-002598] p 111 N83-15803
- LIPSCHULTZ, B.**
Lower-hybrid-heating experiments on the Alcator C and the Versator II Tokamaks [DE82-013674] p 132 N83-13007
- LIPSCOMB, W. O., III**
Pilot-scale assessment of conventional particulate control technology for pressurized fluidized-bed combustion emissions [PB82-230921] p 103 N83-13673
- LIPSKY, S. R.**
Development of newer methods for the isolation and identification of certain components found in complex mixtures derived from energy sources and the determination of their toxicity via bioassay systems [DE82-019043] p 81 N83-10140
- LISSAMAN, P. B. S.**
Optimization of the dynamic inducer wind turbine system p 150 N83-15940
- LITTLE, R. C.**
The effect of additives on the aerosolization of JP-5 jet fuel [AD-A119324] p 106 N83-14294
- LIU, B. L.**
Three-dimensional fluid and electrodynamic modeling for MHD DCW channels [AIAA PAPER 83-0464] p 117 A83-16732
- LIU, M.-K.**
Mathematical model for the analysis of wind-turbine wakes p 117 A83-16108
- LIU, S.**
Analysis of thermal comfort in a passive solar heated residence [PB82-180142] p 39 N83-10297
- LIU, S. T.**
TI-59 program for calculating the annual energy requirements for residential heating and cooling Volume 2. Program reference manual [DE82-020275] p 13 N83-13595
- LIUBIMOV, G. A.**
Computational model of a diffuse discharge on electrodes in a weakly ionized plasma p 114 A83-11952

- LJUNGSTROEM, O.**
Some innovative concepts in wind turbines of the axial-flow, cross-flow, and combined (dual) flow types p 149 N83-15935
- LOBITZ, D. W.**
Forced vibration analysis of rotating structures with application to vertical axis wind turbines [DE82-000620] p 133 N83-13625
- LOEB, H.**
Nuclear energy in space p 113 A83-11837
- LOESCH, H. R.**
Retrospect of solar cell development in West Germany p 64 N83-14712
- LOEW, E.**
Measuring program for the R and D project on gasification of domestic and industrial wastes [BMFT-FB-T-82-118] p 16 N83-13652
- LOGAN, B. G.**
Designs of tandem-mirror fusion reactors [DE82-000845] p 138 N83-15134
- LONG, C.**
ARABSAT solar array p 66 N83-14733
- LONGHETTO, A.**
Determination of the interference between the elements of a central-receiver solar system p 24 A83-11848
- LONGHURST, G. R.**
Methods to enhance blanket power density [DE82-017487] p 127 N83-10958
- LONGRIGG, P.**
Performance criteria for photovoltaic energy systems, volume 1 [DE82-021958] p 56 N83-13596
Performance criteria for photovoltaic energy systems, volume 2 [DE82-021683] p 56 N83-13597
- LOO, R. Y.**
GaAs solar cells for concentrator systems in space p 70 N83-15820
Defects and annealing studies in 1-Me electron irradiated (AlGa)As-GaAs solar cells p 70 N83-15822
- LORCH, G.**
Development of a 5.5 m diameter vertical axis wind turbine, phase 3 [BMFT-FB-T-82-086] p 122 N83-10624
- LORENZEN, B.**
Simple anemometer for wind classification [BMFT-FB-T-82-106] p 92 N83-10719
- LORING, C. M.**
Second-cyclotron-harmonic emission measurements on ISX-B [DE82-009938] p 126 N83-10949
- LOSHENKOVA, N. S.**
An experimental study of fuel combustion in a high-temperature air counterflow p 79 A83-14056
- LOTTI, R.**
Self-annealed ion implanted solar cells p 25 A83-12290
- LOUIS, J. F.**
The MHD disk generator as a multimewatt power supply operating with chemical and nuclear sources p 141 N83-15848
- LOUTFY, R. O.**
Photovoltaic properties of cadmium sulfide/trivalent-metal phthalocyanine heterojunction devices p 39 A83-19259
- LOVELL, T. W.**
Protection of large capacitor banks [DE82-017353] p 120 N83-10366
- LOVINSKII, S. I.**
The theory of aircraft engines p 113 A83-10675
- LUCAS, J. W.**
Parabolic Dish Solar Thermal Power Annual Program Review, proceedings [NASA-CR-169365] p 42 N83-10525
- LUCAS, W. C.**
Conceptual design of the 6 MW MOD-5A wind turbine generator p 147 N83-15919
- LUCKHARDT, S. C.**
Lower hybrid RF current drive and electron-cyclotron heating on the Versator 2 Tokamak [DE82-017127] p 125 N83-10934
- LUCKIE, P. T.**
Expansion of coal-preparation-plant simulator [DE82-001576] p 106 N83-14301
- LUDOWISE, M. J.**
Progress toward cascade cells made by OM-VPE p 69 N83-15813
- LUDWIG, F. L.**
A diagnostic model for estimating winds at potential sites for wind turbines p 79 A83-12954
- LUHRMANN, H.**
Fundamental research into high voltages for further development of electric power distribution systems [BMFT-FB-T-82-064] p 157 N83-10368

PERSONAL AUTHOR INDEX

- LUNDSAGER, P.**
On the power regulation of small wind turbines based on experience with small Danish wind turbines p 148 N83-15926
- LUNDSTROM, M. S.**
High-intensity solar cells [DE82-020420] p 51 N83-12550
- LUQUE, A.**
50 per cent more output power from an albedo-collecting flat panel using bifacial solar cells p 29 A83-13700
- LUTHE, J. C.**
Remote sensing of coal-fired MHD by optical diagnostic techniques [AIAA PAPER 83-0469] p 80 A83-16736
- LUTWACK, R.**
Flat-plate collector research area Silicon material task p 41 N83-10519
- LUTZ, I. C.**
Lawrence Berkeley Laboratory neutral-beam engineering test facility power-supply system [DE82-003044] p 137 N83-15104
- LYNCH, V. E.**
Resistive MHD studies of high-beta Tokamak plasmas [DE82-008101] p 126 N83-10942
Resistive MHD studies of high-beta-Tokamak plasmas [DE82-001476] p 139 N83-15141
- LYNN, D. K.**
Application of fuel cells to highway and nonhighway transportation [DE82-004365] p 156 N83-16259
- ## M
- MA, C. H.**
Faraday-rotation measurements in ISX-B [DE82-011507] p 127 N83-10953
- MABON, J. C.**
An investigation of deposition parameter dependence of optical properties, microstructure and thermal stability of black chrome selective surfaces p 34 A83-15497
- MACCHI, E.**
Test results of a medium temperature solar engine p 115 A83-16000
- MACCIO, C.**
Test results of a medium temperature solar engine p 115 A83-16000
- MACDONALD, H.**
Exploration for fractured petroleum reservoirs using radar/Landsat merge combinations p 77 A83-10031
- MACEDO, I. C.**
Studies on radiation intensity distribution in the focus of compound parabolic concentrators p 38 A83-18565
- MACEK, A.**
A laboratory approach to obtain suspension combustion data for reuse derived fuels p 87 N83-10579
- MACHENS, U.**
Measurement studies of a 15 kW wind power plant [BMFT-FB-T-82-109] p 122 N83-10633
- MACIE, T. W.**
Distributed photovoltaic systems Utility interface issues and their present status Intermediate/three-phase systems [NASA-CR-169664] p 61 N83-14686
- MADIO, F. R.**
Wind power for the electric-utility industry Policy incentives for fuel conservation p 1 A83-11896
- MAEKAWA, S.**
Technical and economical assessment on Tethered Wind-Energy Systems (TWES) [DE82-017120] p 121 N83-10604
- MAGEE, C. W.**
Deuterium flux measurements in the edge plasmas of PLT and PDX during auxiliary heating experiments [DE82-001809] p 139 N83-15143
- MAGID, L. J.**
Chemicals enhanced oil recovery [DE82-003475] p 105 N83-14206
- MAGULA, P.**
Lower-hybrid heating experiment on the TM-1-MH Tokamak p 150 N83-16116
Soft X-ray diagnostics on Tokamak TM-1-MH p 151 N83-16121
Energy balance in TM-1-MH Tokamak (ohmic heating) p 151 N83-16122
- MAHEFFEY, T.**
Performance characteristics of the double-wall artery high capacity heat pipe [AIAA PAPER 83-0318] p 157 A83-16648
- MAHINI, R. T.**
Use of waste heat in district systems with considerations of seasonal-heat-demand variations [DE82-019923] p 14 N83-13614

PERSONAL AUTHOR INDEX

MCILWAIN, M. E.

- MAHONEY, D. E.**
Study of photovoltaic residential retrofits. Volume 1:
Executive summary p 46 N83-10605
[DE82-015793]
Study of photovoltaic residential retrofits. Volume 2:
Main report p 53 N83-12566
[DE82-015826]
- MAHONEY, A. R.**
Solar hemispherical reflectometer modification for
second-surface mirror measurement p 47 N83-10610
[DE82-016913]
- MAHONEY, P. C.**
Data report for the Northeast Residential Experiment
Station, May 1982 p 51 N83-12553
[DE82-020398]
Data report for the Northeast Residential Experiment
Station, Apr. 1982 p 53 N83-12569
[DE82-021854]
- MAINIERO, R. J.**
Evaluation of a sheathed permissible explosive charge
for open shooting in flammable atmospheres. Adobe
charge program p 103 N83-13636
[PB82-220732]
- MAINTON, K. H.**
Steam generator with circulating atmospheric fluidized
bed combustion [BMFT-FB-T-82-134] p 94 N83-11596
- MALACHESKY, P.**
Parametric behavior of the circulating zinc-bromine
battery [DE82-001910] p 167 N83-14759
- MALANNI, S. R.**
Pilot-scale assessment of conventional particulate
control technology for pressurized fluidized-bed
combustion emissions [PB82-230921] p 103 N83-13673
- MALCOLM, D. J.**
Review of DAF Indal VAWT commercialization
programs p 148 N83-15930
- MALET, L. M.**
Wind power potential in Belgium
[PUBL-SER-B-115] p 86 N83-10563
- MALEY, M. P.**
Superconducting-transmission-line project at the Los
Alamos National Laboratory [DE82-021835] p 158 N83-12344
- MALIK, Z. I.**
Development of geothermal binary-cycle working-fluid
properties. Information and analysis of cycles
[DE82-021542] p 102 N83-13602
- MANIER, G.**
Determination of climatological parameters of global
radiation and direct solar radiation for horizontal, not
horizontal, fixed and normal incident radiation absorber
[BMFT-FB-T-82-070] p 48 N83-10718
- MANIFACIER, J.-C.**
Schottky revisited p 34 A83-15509
- MANN, L. W.**
Equilibrium poloidal field distributions in
reversed-field-pinch toroidal discharges
[DE82-014130] p 134 N83-13996
- MANOS, D. M.**
Deuterium flux measurements in the edge plasmas of
PLT and PDX during auxiliary heating experiments
[DE82-001909] p 139 N83-15143
- MANOVE, M.**
A review of the Energy Productivity Center's least cost
energy strategy study [PB82-188111] p 11 N83-12591
- MANZO, M.**
Polyvinyl alcohol membranes as alkaline battery
separators [NASA-TM-82961] p 119 N83-10135
- MANZO, M. A.**
Development and evaluation of polyvinyl-alcohol blend
polymer films as battery separators [NASA-TM-82981] p 167 N83-15372
- MAO, B. Y.**
Microdistribution of oxygen in silicon and its effects on
electronic properties p 71 N83-15825
- MARCH, F.**
Wind power for the electric-utility industry: Policy
incentives for fuel conservation p 1 A83-11896
- MARGEN, P.**
Seasonal thermal storage Swedish practice,
developments and cost projections [PB82-232331] p 165 N83-13635
- MARINE, I. W.**
Parametric study of geohydrologic performance
characteristics for nuclear-waste repositories
[DE82-003145] p 17 N83-13973
- MARK, J. W. K.**
Heavy-ion inertial fusion: Initial survey of target gain
versus ion-beam parameters [DE82-003069] p 138 N83-15117
- MARKS, G. W.**
The design of the L-SAT solar array p 66 N83-14730
- MARKS, S. B.**
The effect of crystal size on the thermal energy storage
capacity of thickened Glauber's salt p 160 A83-18562
- MARKVART, T.**
Electron and photon degradation of boron doped FZ
silicon solar cells p 64 N83-14711
- MARMAR, E. S.**
Lower-hybrid-heating experiments on the Alcator C and
the Versator II Tokamaks [DE82-013874] p 132 N83-13007
- MARNER, W. J.**
An assessment of gas-side fouling in cement plants
[NASA-CR-169513] p 15 N83-13644
- MARRIOTT, T. D.**
Automated probe microdistillation/mass spectrometry
for the analysis of high-molecular weight compounds in
fossil fuels [PB82-022039] p 95 N83-12202
- MARSHALL, T. C.**
Observations of plasma rotation in the high-beta
Tokamak Torus 2 [DE82-018373] p 127 N83-10952
- MARTIN, J. F.**
The ORNL Thermal Energy Storage Program
[DE81-032001] p 168 N83-15944
- MARTIN, L.**
Transport of solar energy with optical fibres p 29 A83-13698
- MARTIN, T. H.**
Pulsed power for inertial-confinement fusion
[DE82-001891] p 137 N83-15116
- MARU, H.**
Internal reforming for natural gas fueled molten
carbonate fuel cells [PB82-200676] p 128 N83-11607
- MARX, C.**
Development of new and improvement of existing core
recovery methods [BMFT-FB-T-82-091] p 81 N83-10705
- MASKARINEC, M. P.**
Analysis of treated sludges and associated leachates
from coal-conversion facilities [DE82-001488] p 103 N83-13850
- MASLOSKI, K.**
Air Force development of thin GaAs solar cells p 69 N83-15816
- MASON, H. B.**
Environmental assessment of stationary source NOx
control technologies [PB82-249350] p 16 N83-13685
- MASSON, L. S.**
Methods to enhance blanket power density
[DE82-017467] p 127 N83-10958
- MASTERSON, K.**
Scatterplate flux mapping for solar concentrators
[DE82-021359] p 54 N83-12588
- MASUDA, T.**
Mass balance on the arc mode seed electrodes p 154 N83-16211
- MATHIPRAKASAM, B.**
Evaluation of methods for rapid determination of freezing
point of aviation fuels [NASA-CR-167981] p 83 N83-10207
- MATHUR, J.**
Environmental and regulatory aspects of compressed-air
energy storage [DE82-003868] p 19 N83-14757
- MATSUMOTO, S.**
CW-laser annealed solar cells p 23 A83-10638
- MATTAS, R. F.**
Wildcat: A catalyzed D-D Tokamak reactor
[DE82-013712] p 125 N83-10938
- MATTHAEUS, W. H.**
Anisotropy in MHD turbulence due to a mean magnetic
field [NASA-TM-84000] p 131 N83-12998
- MATTHEWS, L. K.**
Theoretical and experimental investigation of high
temperature insulators subjected to intense visible
radiation [AIAA PAPER 83-0158] p 35 A83-16562
- MATTSSON, A. C. J.**
Toroidal flow coal-fired MHD combustor design study
and tests [AIAA PAPER 83-0467] p 118 A83-16734
- MAULE, P. A.**
Applications of remote sensing to wind power facility
siting p 77 A83-10041
- MAWIRA, D.**
Advanced rigid array p 62 N83-14697
- MAXWELL, C. D.**
The STD/MHD codes - Comparison of analyses with
experiments p 116 A83-16105
- Self-excited MHD power source for space applications
p 141 N83-15849
- MAYA, L.**
Prospects of low-activation fusion-reactor design
[DE82-003198] p 155 N83-16231
- MAYBEE, J. D.**
Spectroradiometer measurements in support of
photovoltaic device testing p 32 A83-15458
- MAYER, H.**
Production technology of an electrolyte for Na/S
batteries [BMFT-FB-T-82-065] p 161 N83-10614
- MAYS, I. D.**
Recent progress in the development of the Musgrove
vertical axis wind turbine p 149 N83-15937
- MAZER, J. A.**
Methods for investigating the properties of
polycrystalline silicon p-n junction solar cells p 46 N83-10565
- MAZIERE-BEZES, D.**
Optical properties of gold-magnesia selective cermets
p 33 A83-15482
- MCARTHUR, R. C.**
Wind power for the electric-utility industry Policy
incentives for fuel conservation p 1 A83-11896
- MCBREEN, J.**
Zinc electrode morphology in alkaline solutions I - Study
of alternating voltage modulation on a rotating disk
electrode p 115 A83-15867
- MCCALLUM, P. W.**
Status of alcohol-fuels-utilization technology for highway
transportation A 1981 perspective Volume 1
Spark-ignition engines [DE82-020493] p 96 N83-12255
- MCCANDLESS, S. W., JR.**
The 100 days of Seasat-A p 78 A83-10115
- MCCARTHY, R.**
Analysis of small commercial photovoltaic applications
[DE82-020924] p 51 N83-12548
- MCCARTHY, R. M.**
Institutional factors in resource recovery co-disposal
demonstration project, Middlesex County, New Jersey,
Spring 1980 - Summer 1981 p 4 N83-10588
- MCCLAIN, A. W.**
Techniques for the solution of MHD generator flows
[AIAA PAPER 83-0465] p 118 A83-17928
- MCCONNELL, J. W.**
ORNL integral experiment to provide data for evaluating
magnetic-fusion-energy shielding concepts. Part 1
Attenuation measurements [DE82-019775] p 135 N83-13999
- MCCORMICK, J. B.**
Application of fuel cells to highway and nonhighway
transportation [DE82-004365] p 156 N83-16259
- MCDERMOTT, F. S.**
Observation of the parametric decay instability during
electron cyclotron resonance heating on the Versator 2
Tokamak [DE82-012573] p 125 N83-10939
- MCDONALD, G. E.**
Method for depositing an oxide coating
[NASA-CASE-LEW-13131-1] p 39 N83-10494
- MCDONALD, R. C.**
Sources of pressure in lithium thionyl chloride
batteries p 160 A83-12054
- MCDONALD, R. R.**
Flat Plate Solar Array Project: Proceedings of the 20th
Project Integration Meeting [NASA-CR-169370] p 39 N83-10505
- MCFADDEN, D.**
Residential End-use Energy Planning System (REEPS)
[DE82-906444] p 14 N83-13619
- MC GILL, R. N.**
The ORNL Thermal Energy Storage Program: Technical
support [DE81-030805] p 168 N83-15943
- MCQUIRE, P. L.**
Methane hydrate gas production Evaluating and
exploiting the solid gas resource [DE82-004373] p 110 N83-15498
- MCHUGH, J. P.**
Large-area sheet task advanced dendritic web growth
development [NASA-CR-169624] p 58 N83-14665
- Large-area sheet task advanced dendritic web growth
development [NASA-CR-169639] p 59 N83-14669
- Large-area sheet task advanced dendritic web growth
development [NASA-CR-169637] p 59 N83-14675
- MCILWAIN, M. E.**
Evaluation of plasma jet ignition for improved
performance of alternate fuels [AD-A120160] p 112 N83-16212

MCINALLY, I. D.

MCINALLY, I. D.

Electrophoretic Cds/Cu₂S solar cells for space applications p 63 N83-14704

MCKEE, W. R.

Development of the spherical silicon solar cell p 36 A83-17347

MCKOWN, M. M.

Components identified in energy-related wastes and effluents [PB82-236985] p 101 N83-13283

MCLARNON, F.

Technology-base research project for electrochemical storage report for 1981 [DE82-020599] p 163 N83-12573

MCLEAN, M. A.

Evaluation of solar-air-heating central-receiver concepts [DE82-016924] p 48 N83-11586

MCNICHOLS, J. L., JR.

Approach to Nitinol power plant cost analysis p 112 A83-10656

MCNULTY, J. S.

Analytical techniques for aromatic components in aircraft fuels [AD-A118838] p 96 N83-12252

MCVEY, J. B.

Combustion of coal gas fuels in a staged combustor [NASA-TM-82987] p 85 N83-10556

MEHTA, S.

Effects of processing and dopant on radiation damage removal in silicon solar cells p 63 N83-14708

MEIER, D.

Large-area sheet task advanced dendritic web growth development [NASA-CR-169624] p 58 N83-14665

Large-area sheet task advanced dendritic web growth development [NASA-CR-169639] p 59 N83-14669

Large-area sheet task advanced dendritic web growth development [NASA-CR-169637] p 59 N83-14675

MEIERZUKOECKER, H.

Investigation of extracts by fluidized bed extraction [BMFT-FB-T-82-068] p 81 N83-10142

MEISSINGER, H. F.

Optimal sun-alignment techniques of large solar arrays in electric propulsion spacecraft [AIAA PAPER 82-1898] p 25 A83-12475

MEISTER, C. A.

Computer modeling of mixing and agglomeration in coal-conversion reactors Volume 1 Model formulation [DE82-014836] p 84 N83-10212

MELIS, M.

Prototype solar house Study of the scientific evaluation and feasibility of a research and development project [BMFT-FB-T-82-137] p 49 N83-11598

MENDELBAUM, M. A.

A method for analyzing thermionic-converter batteries p 119 A83-19609

MENZER, R.

Experiments on the ADAM 1 plant for the optimization of methanization process in the long distance nuclear energy transmission system test run performed in the spring of 1980 [BLL-T5869/BG/MRS14614/82] p 85 N83-10495

MERLI, P. G.

Self-annealed ion implanted solar cells p 25 A83-12290

MERONEY, R. N.

The behavior of LNG vapor clouds Wind-tunnel simulation of 40 M3 LNG spill tests at China Lake Naval Weapons Center, California [PB82-199027] p 12 N83-12665

LNG plume interaction with surface obstacles [PB82-198995] p 12 N83-12666

MERRYMAN, E. L.

CaO interactions in the staged combustion of coal [DE82-003273] p 105 N83-14205

MERTENS, R.

Lift off A very fine front metallization geometry technique for high efficiency solar cells p 62 N83-14701

METZENDORF, H.

Electron conductivity of the active masses of lead acid batteries during discharge and permanent service [BMFT-FB-T-82-078] p 161 N83-10619

MEULENBERG, A.

Basis for equivalent fluence concept in space solar cells p 71 N83-15827

Silicon research and technology p 72 N83-15835

MEYERS, P. S.

Alcohol as a fuel for farm and construction equipment [DE82-021022] p 100 N83-13277

MIERSCH, S.

Reconstruction and testing of the flue gas desulfurizing plant. Weiher 2 [BMFT-FB-T-82-108] p 91 N83-10652

MILDER, F. L.

Applications of materials surface modification to prime power systems p 144 N83-15878

MILES, J. H.

Analysis of combustion spectra containing organ pipe tone by cepstral techniques [NASA-TM-83034] p 77 N83-16153

MILEY, G. H.

Advanced fuel concepts and applications [DE82-002710] p 137 N83-15110

Status, research requirements and potential applications for nuclear pumped lasers p 143 N83-15862

MILLER, D. R.

The effect of yaw on horizontal axis wind turbine loading and performance [NASA-TM-82778] p 136 N83-14688

MILLER, H. C.

Sampling for high-molecular-weight organic compounds in power plant stack gases [PB82-234618] p 16 N83-13659

MILLER, J. L.

The swing to concentrator arrays p 61 N83-14695

MILLER, L. G.

Methods to enhance blanket power density [DE82-017467] p 127 N83-10958

MILLER, R. L.

Parametric systems analysis of the Modular Stellarator Reactor (MSR) [DE82-016244] p 126 N83-10945

MILLNER, A. E.

Study of photovoltaic residential retrofits Volume 1 Executive summary [DE82-015793] p 46 N83-10605

Study of photovoltaic residential retrofits Volume 2 Main report [DE82-015626] p 53 N83-12566

MILLS, P. E.

Source test and evaluation report. Alcohol facility for gasohol production [PB82-237041] p 101 N83-13280

MINARDI, J. E.

An update of the electrofluid dynamics wind driven generators p 149 N83-15936

MINER, D. L.

NECAP 4 1 NASA's Energy-Cost Analysis Program fast input manual and example [NASA-TM-83241] p 4 N83-10566

MINETTI-MEZZETTI, E.

Research on the characteristic parameters of thermophotovoltaic /TPV/ converter performance p 24 A83-12029

Evaluation of thermophotovoltaic conversion efficiency p 35 A83-16086

MINODA, K.

Welding of AL-MG alloy 5083-0 for the construction of LNG storage tanks p 93 N83-11500

MISKOLCZY, G.

Thermionic technology for spacecraft power: Progress and problems p 145 N83-15887

MISRA, B.

Wildcat. A catalyzed D-D Tokamak reactor [DE82-013712] p 125 N83-10938

MITCHELL, K. W.

Status of new thin-film photovoltaic technologies p 23 A83-11510

MITCHELL, R.

Wind-energy program FY 1982 third quarterly review [DE82-019928] p 133 N83-13714

MIYAHARA, T. F.

Simulated space flight testing of commercial terrestrial silicon cells p 69 N83-15811

MODESTINO, J. W.

Digital image transmission and coding p 127 N83-11397

MOELLER, M.

Properties of amorphous silicon solar cells p 25 A83-12321

MOESER, W.

Determination of the radiation budget at the Earth's surface from satellite data p 68 N83-14808

MOHTADI, M.

Pressure-swinging underground gasification Theoretical and experimental investigations of gasification, phase 2 [BMFT-FB-T-82-066] p 89 N83-10615

MOIR, R. W.

Feasibility study of a fission-suppressed tandem-mirror hybrid reactor [DE82-019375] p 134 N83-13997

Designs of tandem-mirror fusion reactors [DE82-000845] p 138 N83-15134

MOKASHI, A. R.

Price estimates for the production of wafers from silicon ingots [NASA-CR-169517] p 55 N83-13583

MOLVIK, A. W.

Plasma parameter measurements using neutral-particle-beam attenuation [DE82-021120] p 132 N83-13001

MONGIA, H. C.

Design of a low emission combustor for an automotive gas turbine [AIAA PAPER 83-0338] p 117 A83-16664

MONTE, J. A.

The use of near color infrared photography to assess the impact of the oil and natural gas industry on Louisiana's wetlands p 1 A83-10069

MONTGOMERY, D.

Anisotropy in MHD turbulence due to a mean magnetic field [NASA-TM-84000] p 131 N83-12998

MOOG, W.

Conserving energy by improving the quality of the air purifying and air conditioning systems [BMFT-FB-T-82-067] p 6 N83-10651

MOON, H. P.

Solid waste to methane gas (RefCOM) p 88 N83-10584

MOON, F. C.

Magnetoelastic instabilities and vibrations of superconducting-magnet systems [DE82-015206] p 123 N83-10880

MOORE, H. F.

Refining of military jet fuels from shale oil Part 1 Preliminary process design, economic and yield optimization, and computer modeling [AD-A117511] p 83 N83-10210

MOORE, T. J.

Evaluation of electrode shape and nondestructive evaluation method for welded solar cell interconnects [NASA-TM-82966] p 45 N83-10555

Microstructural analysis of solar cell welds p 72 N83-15833

MORAWSKI, J.

Attempt to determine the power demand of a helicopter control system on the basis of flight tests p 1 A83-10439

MOREAU, Y.

Schottky revisited p 34 A83-15509

MORELAND, F. L.

Earth-covered buildings An exploratory analysis for hazard and energy performance [PB82-189564] p 10 N83-12285

MORGAN, G. L.

ORNL integral experiment to provide data for evaluating magnetic-fusion-energy shielding concepts Part 1 Attenuation measurements [DE82-019775] p 135 N83-13999

MORGAN, P.

A groundwater convection model for Rio Grande rift geothermal resources p 79 A83-11831

MORIARTY, J. J.

Power conditioning subsystem design [AD-A117736] p 121 N83-10569

MORIN, T.

Measurements of energy distribution and thrust for microwave plasma coupling of electrical energy to hydrogen for propulsion [AIAA PAPER 82-1951] p 75 A83-12508

MORRIS, C. J.

Fluidized-bed pyrolysis of oil shale Oil yield, composition, and kinetics [DE82-021010] p 97 N83-12571

MORRIS, J. F.

Some material implications of space nuclear reactors (non-fuel materials) p 170 N83-15870

MORRISON, A. D.

Large-area silicon sheet task p 41 N83-10520

MORRISON, S. R.

Electrochemical storage cell based on polycrystalline silicon [DE82-020595] p 56 N83-13600

MORTON, R. A.

Geologic studies of geopressed and hydropressed zones in Texas Test well site selection [PB82-220542] p 94 N83-11653

MOSES, R. S.

Petrographic evaluation of pyrite in the products from two-stage coal-pyrite flotation [DE82-003593] p 105 N83-14208

MOSKOWITZ, P. D.

A reference-material system for estimating health and environmental risks of selected material cycles and energy systems [DE82-019309] p 15 N83-13647

MOTTER, A. D.

Study of photovoltaic residential retrofits Volume 2. Main report [DE82-015626] p 53 N83-12566

N

- MOTTER, A. E.**
Study of photovoltaic residential retrofits Volume 1
Executive summary
[DE82-015793] p 46 N83-10605
- MOUSTAFA, S.**
A point focusing collector for an integrated water/power
complex p 44 N83-10541
- MUBAYI, V.**
Harnessing the Sun for development. Actions for
consideration by the international community at the UN
Conference on New and Renewable Sources of Energy
for promoting the use of renewable energy in developing
countries
[DE82-020273] p 52 N83-12558
- MUCH, C. H.**
Residential photovoltaic experiment station data
system
[DE82-001646] p 68 N83-14762
- MUELLER, W.**
Development of a 5.5 m diameter vertical axis wind
turbine, phase 3
[BMFT-FB-T-82-086] p 122 N83-10624
- MUI, J. Y. P.**
Investigation of the hydrochlorination of SiCl₄
[NASA-CR-169621] p 58 N83-14668
Investigation of the hydrochlorination of SiCl₄
[NASA-CR-169622] p 60 N83-14682
- MUKHAMETZIANOV, F. KH.**
A relativistic plasma microwave generator
p 115 A83-15909
- MULLIN, J. P.**
NASA space photovoltaic research and technology
programs p 64 N83-14713
NASA-OAST program in photovoltaic energy
conversion p 68 N83-15807
- MUNOZ, L. C.**
The reduction of radiation damage in solar cells. A study
of radiation defects in silicon, first phase
[CESR-81-985] p 57 N83-13626
- MUNZ, P.**
Investigation of new solar cells Part A Novel
semiconductors and their suitability Part B Polycrystalline
MIS diodes
[BMFT-FB-T-82-103] p 48 N83-10632
- MURAMATSU, S.**
Theoretical temperature dependence of short-circuit
current of drift-field solar cells p 24 A83-11991
- MURIN, J.**
Potential for use of peat blends with coal for electric
power generation
[DE82-003634] p 110 N83-15497
- MURPHREE, D. L.**
Remote sensing of coal-fired MHD by optical diagnostic
techniques
[AIAA PAPER 83-0469] p 80 A83-16736
- MURPHY, L. M.**
Structural design considerations for a line-focus
reflective module using inexpensive composite materials
[DE82-021611] p 54 N83-12587
- MURRAY, H. S.**
Application of fuel cells to highway and nonhighway
transportation
[DE82-004365] p 156 N83-16259
- MURRAY, J. N.**
Advanced alkaline electrolysis cell development.
Development of electrolysis operation cell separator for
1250C
[DE82-020697] p 76 N83-13593
- MURTHA, M. J.**
Performance characteristics of heavy media cyclones
using fly ash-derived heavy media p 86 N83-10574
- MUSGROVE, P. J.**
A review of UK wind energy activities
p 114 A83-13650
Recent progress in the development of the Musgrove
vertical axis wind turbine p 149 N83-15937
- MUSHRUSH, G. W.**
Pyrolysis of organic compounds containing long
unbranched alkyl groups
[AD-A119749] p 104 N83-14165
- MUZZY, D. B.**
A transmittance-optimized, point-focus Fresnel lens
solar concentrator p 42 N83-10530
- MYERS, P. S.**
Diesel combustion analysis using rapid sampling
techniques
[AD-A119658] p 104 N83-14192
- MYERS, T. C.**
Mathematical model for the analysis of wind-turbine
wakes p 117 A83-16108
- MYRA, J. R.**
Reduction of neoclassical losses in
magnetic-confinement devices
[DE82-020277] p 132 N83-13003
- NACCACHE, P. F.**
An efficient fully implicit simulator
[CSS-126] p 109 N83-15322
- NAGAOKA, H.**
Welding of AL-MG alloy 5083-0 for the construction of
LNG storage tanks p 83 N83-11500
- NAGATA, A.**
Plasma equilibrium and field diffusion during current rise
phase of STP-2 screw pinch Tokamak
[IPPJ-594] p 123 N83-10919
- NAGATA, N.**
Analysis of target implosion irradiated by proton beam
1 Beam interaction with target plasma
[IPPJ-612] p 134 N83-13989
- NAKAMURA, T.**
Inflow disk generator for open-cycle MHD power
generation p 116 A83-16104
MHD generator research at Stanford
p 142 N83-15854
- NAKANISHI, S.**
Measurements of energy distribution and thrust for
microwave plasma coupling of electrical energy to
hydrogen for propulsion
[AIAA PAPER 82-1951] p 75 A83-12508
- NATESH, R.**
Analysis of defect structure in silicon. Characterization
of samples from UCP ingot 5848-13C
[NASA-CR-169617] p 60 N83-14680
- NATWIG, D. I.**
Ambient temperature rechargeable lithium battery
[AD-A119297] p 166 N83-14742
- NAUKA, K.**
Microdistribution of oxygen in silicon and its effects on
electronic properties p 71 N83-15825
- NEAL, N.**
Thin cell development and testing p 62 N83-14702
- NEAU, E. L.**
Pulsed power for inertial-confinement fusion
[DE82-001991] p 137 N83-15116
- NEDUNGADI, A.**
A simple parameter measurement system for solar
cells p 38 A83-18825
- NEFF, D. E.**
The behavior of LNG vapor clouds. Wind-tunnel
simulation of 40 M3 LNG spill tests at China Lake Naval
Weapons Center, California
[PB82-199027] p 12 N83-12665
LNG plume interaction with surface obstacles
[PB82-198995] p 12 N83-12666
- NEFT, C. L.**
Design and testing of a 13.75 MW converter for a
superconducting magnetic-energy-storage system
[DE82-002385] p 166 N83-14749
- NELLUMS, R. O.**
The 17-M VAWT program
[DE82-003497] p 137 N83-14756
Status report of the 17-m VAWT program
p 148 N83-15931
- NELSON, V.**
Agricultural application of SWECS
p 111 N83-15923
- NELVING, H. G.**
Modifications and testing of a 4-95 Stirling engine for
solar applications p 44 N83-10538
- NEUMANN, D. B.**
Thermodynamic data for desulfurization processes
[PB82-184904] p 95 N83-12207
- NEWBY, K.**
Parametric behavior of the circulating zinc-bromine
battery
[DE82-001910] p 167 N83-14759
- NEWKIRK, L. R.**
Superconducting-transmission-line project at the Los
Alamos National Laboratory
[DE82-021835] p 158 N83-12344
- NIBBE, H.**
Experiments with a twin rotor, single bladed gyromill
p 150 N83-15941
- NICHOLAS, M. O.**
An efficient fully implicit simulator
[CSS-126] p 109 N83-15322
- NIESEN, P. L.**
Remote sensing and uranium exploration at Lisbon
Valley, Utah p 77 A83-10032
- NIGHTINGALE, N.**
Automotive Stirling engine development program
[NASA-CR-167907-1] p 140 N83-15177
- NJS, J.**
Lift off. A very fine front metallization geometry technique
for high efficiency solar cells p 62 N83-14701
- NIPOTI, R.**
Self-annealed ion implanted solar cells
p 25 A83-12290
- NIU, K.**
Sausage instability of Z-discharged plasma channel in
LIB-fusion device
[IPPJ-602] p 123 N83-10917
Analysis of target implosion irradiated by proton beam.
1. Beam interaction with target plasma
[IPPJ-612] p 134 N83-13989
- NOGUCHI, M.**
An experimental study of an aerodynamically optimum
windmill
[NAL-TR-698] p 129 N83-12522
- NOLFI, J.**
Market assessment of photovoltaic power systems for
agricultural applications worldwide
[NASA-CR-165541] p 56 N83-13585
- NONNENMACHER, A.**
Investigation of heat storage for temperature range from
200 to 500 C
[BMFT-FB-T-82-105] p 161 N83-10627
- NORMAN, R. S.**
Site characteristics for wind energy conversion
devices p 130 N83-12528
Horizontal and vertical axis wind turbines
p 130 N83-12529
- NOSANOV, M. E.**
Research, development and demonstration in the design
of sanitary landfill to optimize the generation and capture
of compressible gas p 89 N83-10595
- NOTARDONATO, J. J.**
Combustion characteristics of hydrogen-carbon
monoxide based gaseous fuels p 78 A83-11491
NOx results from two combustors tested on medium
BTU coal gas p 78 A83-11493
Evaluation of advanced combustion concepts for dry
NO sub x suppression with coal-derived, gaseous fuels
[NASA-TM-82985] p 85 N83-10557
Multifuel evaluation of rich/quench/lean combustor
[NASA-TM-82986] p 86 N83-10559
Combustion characteristics of hydrogen Carbon
monoxide based gaseous fuels
[NASA-TM-82998] p 76 N83-10560
- NOUN, R. J.**
Wind-energy program FY 1982 third quarterly review
[DE82-019928] p 133 N83-13714
- NOVICK, A. S.**
Multifuel evaluation of rich/quench/lean combustor
[NASA-TM-82986] p 86 N83-10559
- NOWLAN, M. J.**
Large area space solar cell assemblies
p 68 N83-15810
- NURICK, W.**
Development of criteria for extension of applicability of
low-emission, high-efficiency coal burners
[PB82-187153] p 93 N83-11377
- NUSS, G.**
Performance criteria for photovoltaic energy systems,
volume 1
[DE82-021958] p 56 N83-13596
Performance criteria for photovoltaic energy systems,
volume 2
[DE82-021683] p 56 N83-13597
- NUTTALL, H. E.**
Analysis of preburn three-dimensional flow patterns in
underground coal conversion
[DE82-002405] p 110 N83-15496
- NYDAHL, J.**
Data collection and analysis for geothermal research
[PB82-185430] p 97 N83-12390
- NYLAND, T. W.**
Operating experience with the 200 kW MOD-OA wind
turbine generators p 147 N83-15916
- ODA, S.**
The residual voltage in fast electrophotography of
a-SiH_x/x p 34 A83-15511
- ODOHERTY, R.**
ROSET. A solar-thermal electric-power simulation users
guide
[DE82-021997] p 53 N83-12567
- OELERT, G.**
Thermochemical heat storage State-of-the-art report
[PB82-188087] p 162 N83-11610
- OGALLAGHER, J. J.**
A new evacuated CPC collector tube
p 37 A83-18558
- OHARE, T.**
Design and preparation of new, highly active
Fischer-Tropsch catalysts
[DE82-003670] p 105 N83-14202
- OKAMOTO, M.**
Sufficient stability condition for alpha-driven
velocity-space modes in compression Tokamak
[IPPJ-609] p 131 N83-12996

OKITSU, H.

- OKITSU, H.**
Characteristics of a Savonius windmill power system with a synchronous generator p 115 A83-15797
- OLIKER, I.**
Once-through heat transport and seasonal storage for city of Bellingham [DE82-001501] p 169 N83-15956
- OLIVER, J. R.**
Efficiency-improvement study for GaAs solar cells [DE82-016410] p 48 N83-11585
- OLSEN, J. N.**
Transport of light-ion beams in plasma channels [DE82-001649] p 139 N83-15140
- OLSON, D. B.**
Soot formation in syngases [DE82-004271] p 94 N83-12189
- OLSZEWski, M.**
Industrial thermal energy storage What are the possibilities? [DE82-001494] p 166 N83-14748
Once-through heat transport and seasonal storage for city of Bellingham [DE82-001501] p 169 N83-15956
- OMSTEAD, D. R.**
Membrane controlled anaerobic digestion p 85 N83-10497
- ONEILL, M. J.**
A transmittance-optimized, point-focus Fresnel lens solar concentrator p 42 N83-10530
- ONO, M.**
Effect of low-frequency density fluctuations on ion-cyclotron waves [DE82-002829] p 155 N83-16222
- ORFANOV, I. V.**
Emission characteristics of refractory materials p 116 A83-16019
- ORLANDO, J. A.**
The 40kW fuel cell field test support [PB82-231630] p 133 N83-13633
- ORLOWSKI, S.**
Risks, regulation responsibilities and costs in nuclear waste management A preliminary survey in the European Community [EUR-8893] p 21 N83-15115
- ORSHANSKII, I. S.**
Determination of the integral currents of solar cells using an improved method of spectral sensitivity measurement p 23 A83-11696
- OSTERYOUNG, R. A.**
Thermodynamics and photoelectrochemical behavior of the n-TiO₂ electrode in fluoride containing solutions [AD-A119144] p 58 N83-14179
- OSTOJA, P.**
Self-annealed ion implanted solar cells p 25 A83-12290

- OTAWA, T.**
Development of a slide program describing a site selection process for small Wind-Energy-Conversion Systems (SWECS) [DE82-017394] p 99 N83-12788
- OTT, L. L.**
Fluidized-bed pyrolysis of oil shale Oil yield, composition, and kinetics [DE82-021010] p 97 N83-12571
- OUNALLI, A.**
Production of hydrogen by direct thermal decomposition of water - Preliminary investigations p 75 A83-16042
- OVERLY, P.**
Acurex Parabolic Dish Concentrator (PDC-2) p 42 N83-10527
- OWENS, E. C.**
Installation of a diesel engine combustion/ignition evaluation facility [AD-A119610] p 104 N83-14189
- OWNBEY, S.**
Data collection and analysis for geothermal research [PB82-185430] p 97 N83-12390
- OWREN, H. M.**
Lawrence Berkeley Laboratory neutral-beam engineering test facility power-supply system [DE82-003044] p 137 N83-15104

P

- PACHECO, N. S.**
Simplified solar fraction estimation for space and water heating at Department of Defense installations Appendix C Water heating nomographs [AD-A120014] p 73 N83-15904
Simplified solar fraction estimation for space and water heating at Department of Defense installations Appendix B Space heating nomographs [AD-A120013] p 73 N83-15905

- Simplified solar fraction estimation for space and water heating at Department of Defense installations [AD-A120012] p 74 N83-15906
- PADMANBAN, J.**
Program of basic research on the utilization of coal-water mixture fuels [DE82-002232] p 106 N83-14299
- PAERSCH, M.**
Pressure-swinging underground gasification Theoretical and experimental investigations of gasification, phase 2 [BMFT-FB-T-82-066] p 89 N83-10615
- PAGE-SHIPP, R. J.**
The prediction of the thermal performance of building by the CR-method [CSIR-BRR-396] p 161 N83-11578
- PAISLEY, M. A.**
Conversion of forest residues to a methane-rich gas in a high-throughput gasifier [DE82-020289] p 102 N83-13601
- PAL, D.**
Operating and maintenance experience with a 6-kW wind energy conversion system at Naval Station, Treasure Island, California [AD-A119389] p 136 N83-14740
- PALMOUR, H.**
Evaluation of olivine ceramic refractories for thermal-energy-storage application [DE82-000108] p 168 N83-15947
- PALUSZEK, A. M.**
Evaluation of solar-air-heating central-receiver concepts [DE82-016924] p 48 N83-11586
- PANAMI, Z.**
A computer simulation model of salt-gradient solar ponds p 55 N83-13580
- PANKRATOV, I. M.**
Short wavelength lower hybrid waves nonlinearly excited due to ponderomotive density modulation p 151 N83-16118
- PAPAI, M. P.**
Source test and evaluation report: Alcohol facility for gasohol production [PB82-237041] p 101 N83-13280
- PARADA, M. D. J.**
Automatic interpretation of MSS-LANDSAT data applied to coal refuse site studies in southern Santa Catarina State, Brazil [E83-10066] p 18 N83-14575
- PARFITT, D. J.**
The fuel efficient jet engine [PNR-90114] p 7 N83-11136
- PARFITT, Q. D.**
Program of basic research on the utilization of coal-water mixture fuels [DE82-002232] p 106 N83-14299
- PARK, C.**
The satellite power system - Assessment of the environmental impact on middle atmosphere composition and on climate p 2 A83-14517
- PARK, J. W.**
Schottky revisited p 34 A83-15509
- PARKER, G. H.**
Gas cooled reactors for large space power needs p 142 N83-15858
- PARKER, J.**
Development of an all-metal thick film cost effective metallization system for solar cells [NASA-CR-169635] p 59 N83-14674
- PARKER, V. B.**
Thermodynamic data for desulfurization processes [PB82-184904] p 95 N83-12207
- PARKHURST, W. A.**
Development of improved separators for alkaline zinc batteries [AD-A119150] p 166 N83-14743
- PARRINI, F.**
Determination of the interference between the elements of a central-receiver solar system p 24 A83-11848
- PARTS, L.**
Superior heat-transfer fluids for solar heating and cooling applications Results of acute oral-toxicity determinations [DE82-002758] p 52 N83-12560
- PATANKAR, S. V.**
Heat transfer - A review of 1981 literature p 169 A83-17701
- PATEL, P.**
Internal reforming for natural gas fueled molten carbonate fuel cells [PB82-200676] p 128 N83-11607
- PATERA, R. P.**
Collection of solar energy at specified output temperature p 28 A83-13582

PERSONAL AUTHOR INDEX

- PATTERSON, R. E.**
Miniaturized Cassegrainian concentrator concept demonstration p 71 N83-15830
- PAULLIN, J. N.**
Emerging technologies for the control of hazardous wastes [PB82-236993] p 17 N83-13666
- PAUWELS, H.**
On the formula for the upper limit of photovoltaic solar energy conversion efficiency p 23 A83-10699
- PAVLO, P.**
Short wavelength lower hybrid waves nonlinearly excited due to ponderomotive density modulation p 151 N83-16118
Global model of a hybrid Tokamak reactor with an auxiliary RF heating p 153 N83-16137
- PAYNE, R.**
Development of criteria for extension of applicability of low-emission, high-efficiency coal burners [PB82-197153] p 93 N83-11377
- PEAK, S. C.**
Improved transistorized AC motor controller for battery powered urban electric passenger vehicles [NASA-CR-167978] p 120 N83-10349
- PEASE, R. E.**
Longwall shearer tracking system [NASA-CASE-MFS-25717-1] p 107 N83-14607
- PEDERSEN, B. M.**
Users experience in Denmark Developments, achievements and experience of the Danish activities in wind energy utilization, 1974 - 1981 p 10 N83-12536
- PEEK, C.**
A new evacuated CPC collector tube p 37 A83-18558
- PELL, K.**
Data collection and analysis for geothermal research [PB82-185430] p 97 N83-12390
- PELLEGRINI, G.**
On the properties of the superplastic aluminium-calcium alloy as material for solar collectors p 34 A83-15496
- PELLIN, R.**
Polycrystalline silicon availability for photovoltaic and semiconductor industries p 28 A83-13648
- PERCIVAL, W. H.**
Modifications and testing of a 4-95 Stirling engine for solar applications p 44 N83-10538
- PEREVERZEV, G. V.**
Energy balance in TM-1-MH Tokamak (ohmic heating) p 151 N83-16122
- PERI, G.**
The French thermo-helio-electricity-KW parabolic dish program p 44 N83-10542
- PERSHING, D.**
Development of criteria for extension of applicability of low-emission, high-efficiency coal burners [PB82-197153] p 93 N83-11377
- PETERS, D. A.**
Momentum theory, dynamic inflow, and the vortex-ring state p 116 A83-16026
- PETERSEN, R. A.**
Antimisting kerosene atomization and flammability [NASA-CR-169385] p 95 N83-12246
- PETERSEN, S. R.**
Economic efficiency in the sizing of residential heat pumps [PB82-179029] p 3 N83-10401
- PETERSON, D. J. S.**
Improving energy efficiency of major weapon systems [AD-A119583] p 18 N83-14118
- PETERSON, J. M.**
Landfill gas recovery An analysis of results p 89 N83-10596
- PETERSON, M. E.**
Spectroscopic studies of the hazards of Li/SOCl₂ batteries during anode-limited cell reversal p 114 A83-12056
- PETRZILKA, V. A.**
Short wavelength lower hybrid waves nonlinearly excited due to ponderomotive density modulation p 151 N83-16118
- PETTIT, R. B.**
Black chrome solar selective coatings optimized for high temperature applications p 33 A83-15479
Sol-gel protective coatings for black chrome solar selective films [DE82-004138] p 74 N83-15942
- PETTIT, R. A.**
Power from the hot-dry-rock geothermal resource [DE82-000759] p 107 N83-14750
- PFENDER, E.**
Heat transfer - A review of 1981 literature p 169 A83-17701
- PFISTER, L.**
The satellite power system - Assessment of the environmental impact on middle atmosphere composition and on climate p 2 A83-14517

- PHAN, H. T.**
An analytical investigation of mass flow, pressure and temperature in a flat-plate solar collector
p 37 A83-18452
- PHELPS, D.**
Study of ion beam-initiated inertial-confinement fusion [DE82-013935] p 124 A83-10931
- PHILLIPS, B. R.**
A proposed optical pumping system requiring no electric power p 143 A83-15861
- PIAN, C. C. P.**
Loading schemes for a 50 MWh diagonally connected MHD generator p 113 A83-10659
Techniques for the solution of MHD generator flows [AIAA PAPER 83-0465] p 116 A83-17928
- PICCINI, G.**
A parametric analysis of the performances of a linear collectors' network of a solar power plant p 38 A83-18139
- PIERANTOZZI, R.**
Catalyst and reactor development for a liquid-phase Fischer-Tropsch process [DE82-003369] p 105 A83-14207
- PIERSON, E. S.**
Liquid-metal MHD for space power systems p 141 A83-15850
- PIFFL, V.**
Soft X-ray and VUV emission from REB-heated plasma in REBEX 1 and REBEX 1 machines p 152 A83-16130
- PILLAI, K. K.**
Fluidised-bed combustion Combustion of run-of-mine coal in a 12-inch-diameter pressurized fluidised-bed combustor [DE82-018786] p 95 A83-12204
- PILLER, S.**
Automotive Stirling engine development program [NASA-CR-167907-2] p 140 A83-15176
- PINA, L.**
Ion velocity measurements for laser mass ablation studies p 152 A83-16128
- PINKER, R. T.**
On the surface radiation budget p 22 A83-10100
- PLACKMEYER, J.**
Computerized simulation of the dynamic response of a coal-fired power plant with pressurized fluidized bed [BMFT-FB-T-82-094] p 90 A83-10629
- PLAETTNER, R. D.**
Properties of amorphous silicon solar cells p 25 A83-12321
- PLAHUTNIK, F.**
Development of a polysilicon process based on chemical vapor deposition, phase 1 [NASA-CR-169633] p 59 A83-14673
- PLODINEK, M. J.**
Vitrification of high-level radioactive waste in a small-scale joule-heated ceramic melter [DE82-002227] p 21 A83-15113
- POBEREZHSKIY, L. P.**
Inductive energy stores [AD-A118337] p 162 A83-11582
- POHER, C.**
Solar satellites p 22 A83-10428
- POHLMANN, D.**
Prototype solar house Study of the scientific evaluation and feasibility of a research and development project [BMFT-FB-T-82-137] p 49 A83-11598
- POLLARD, R. K.**
An efficient fully implicit simulator [CSS-126] p 109 A83-15322
- POLLER, J.**
Basic engineering of a 10 t/hr prototype plant for the Vereinigte Elektrizitätswerke Westfalen (VEW) coal conversion process [BMFT-FB-T-82-114] p 101 A83-13378
- POND, S. L.**
Verification testing of the PKI collector at Sandia National Laboratories, Albuquerque, New Mexico p 43 A83-10534
- PONNAPPAN, R.**
Performance characteristics of the double-wall artery high capacity heat pipe [AIAA PAPER 83-0318] p 157 A83-16648
- PONS, R. L.**
Development status of the PDC-1 Parabolic Dish Concentrator p 42 A83-10526
Development status of the small community solar power system p 43 A83-10532
- PONTING, D. K.**
An efficient fully implicit simulator [CSS-126] p 109 A83-15322
- POPELKA, D.**
Aeroelastic stability analysis of a Darrieus wind turbine [DE82-017001] p 121 A83-10603
- POPESCU, I. I.**
A time resolving method for determining the energy spectrum of neutrons emitted by a plasma focus device p 153 A83-16133
- PORKOLAB, M.**
Lower hybrid RF current drive and electron-cyclotron heating on the Versator 2 Tokamak [DE82-017127] p 125 A83-10934
Observation of the parametric decay instability during electron cyclotron resonance heating on the Versator 2 Tokamak [DE82-012573] p 125 A83-10939
Lower-hybrid-heating experiments on the Alcator C and the Versator II Tokamaks [DE82-013674] p 132 A83-13007
- PORSCHKE, H.**
Preliminary results of Helios solar generator inflight performance evaluation p 64 A83-14716
- POST, H.**
Performance criteria for photovoltaic energy systems, volume 1 [DE82-021958] p 56 A83-13596
Performance criteria for photovoltaic energy systems, volume 2 [DE82-021683] p 56 A83-13597
- POULSEN, P. D.**
Longwall shearer tracking system [NASA-CASE-MFS-25717-1] p 107 A83-14607
- POWELL, J. R.**
Compact, high-power nuclear reactor systems based on small diameter particulate fuel p 143 A83-15859
- POWELL, J. W.**
Comparative analysis of economic models in selected solar energy computer programs [PB82-184995] p 55 A83-12589
- POWELL, R. V.**
Sacramento Municipal Utility District 100-MW sub e photovoltaic plant p 40 A83-10513
- POWERS, S. A.**
The application of energy saving concepts to future fighter/attack aircraft design [AIAA PAPER 83-0092] p 2 A83-16516
- POWERS, T. J., III**
Source test and evaluation report. Alcohol facility for gasohol production [PB82-237041] p 101 A83-13280
- PRAGER, S. C.**
Poleoidal ohmic heating in a multipole [DE82-018888] p 134 A83-13998
- PRASAD, A.**
Advanced regenerative heat recovery system [PB82-200650] p 8 A83-11604
- PRATT, L.**
The reduction of radiation damage in space solar cells A study of radiation defects in silicon (+) p 63 A83-14710
- PRATT, R.**
The effect of additives on the aerosolization of JP-5 jet fuel [AD-A119324] p 106 A83-14294
- PREINHAELTER, J.**
Power spectrum optimization of the three-waveguide grill for the T-7 Tokamak p 150 A83-16117
Numerical simulation of the interaction of an electromagnetic wave with an inhomogeneous plasma p 154 A83-16140
- PREISWERK, P. R.**
Extendible and retractable masts for solar array developments p 65 A83-14725
- PRESTON, E. L.**
Biomedical and environmental sciences programs at the Oak Ridge National Laboratory [DE82-019897] p 13 A83-13516
- PRETLOVE, A. J.**
A review of aero-generator fatigue problems p 119 A83-18939
- PREUIT, L. C.**
Development of a solid waste fired fluidized boiler, phase 1 p 88 A83-10592
- PRINCE, M.**
National photovoltaic program p 3 A83-10506
- PRINZLER, H.**
Dynamics of ionization and transport in a magnetically confined plasma column p 153 A83-16132
- PROROK, L. M.**
Startup conditions of alkali-metal vaporization from rectangular channels p 157 A83-18448
- PROSVETOV, V. V.**
Startup conditions of alkali-metal vaporization from rectangular channels p 157 A83-18448
- PUGMIRE, R. J.**
A carbon-13 and proton nuclear magnetic resonance study of some experimental referee broadened-specification /ERBS/ turbine fuels p 78 A83-11482
- PUTNAM, E. S.**
Vehicle characterization for the TAPCUT Project Performance and cost [DE82-019772] p 13 A83-13465
- PUTT, R. A.**
Development of zinc bromide batteries for stationary energy storage [DE82-019283] p 164 A83-13612

Q

- QI, S.-X.**
The influence of the interface state on the properties of solar cell semiconductor electrodes p 26 A83-13473
- QIANG, H.**
Physics (selected articles) [AD-A119830] p 154 A83-16143
- QUAZZO, F.**
On the properties of the superplastic aluminum-calcium alloy as material for solar collectors p 34 A83-15496
- QUINLIVAN, S.**
A compendium of synfuel end use testing programs [PB82-236936] p 100 A83-13279
- QUITTNER, E.**
The design of the L-SAT solar array p 66 A83-14730

R

- RABINOVICH, M. S.**
A relativistic plasma microwave generator p 115 A83-15909
- RABL, A.**
Optimization of parabolic trough solar collectors p 29 A83-13699
- RACKLEY, R. A.**
Advanced Gas Turbine (AGT) powertrain system development program [NASA-CR-169475] p 128 A83-12088
- RAE, J.**
An efficient fully implicit simulator [CSS-126] p 109 A83-15322
- RAGAINI, V.**
Solar energy storage by the reversible reaction - N₂O₄ yields 2NO₂ - Theoretical and experimental results p 37 A83-18554
- RAGHUNATHAN, S.**
Performance of the Wells turbine at starting p 113 A83-10661
- RAGHURAMAN, P.**
Data report for the Northeast Residential Experiment Station, May 1982 [DE82-020398] p 51 A83-12553
Simulation of thermal aspects of residential photovoltaic systems [DE82-020399] p 51 A83-12555
Electrical aspects of photovoltaic-system simulation [DE82-021956] p 53 A83-12568
Data report for the Northeast Residential Experiment Station, Apr 1982 [DE82-021954] p 53 A83-12569
- RAHILLY, W. P.**
Defects and annealing studies in 1-Me electron irradiated (AlGa)As-GaAs solar cells p 70 A83-15822
Grown-in defects and defects produced by 1-Me electron irradiated in Al_{0.3}Ga_{0.7}As P-N junction solar cells p 71 A83-15828
- RAJU, G. V. R.**
Thermionically emitting copper cathode in contact with combustion plasmas p 116 A83-16101
- RALPH, E. L.**
PV history: Lessons for the future p 40 A83-10514
- RAM, A.**
Antenna-plasma coupling theory for ICRF heating of large tokamaks [DE82-013226] p 125 A83-10933
- RAMACHANDRAN, S.**
Gasification kinetics for biomass decomposition [PB82-189043] p 97 A83-12256
- RAMSEY, J. W.**
Heat transfer - A review of 1981 literature p 189 A83-17701
- RANCK, D.**
Scale effects in liquefied fuel vapor dispersion [DE82-006198] p 11 A83-12659
- RANGI, R. S.**
Measurements on the Magdalen Islands VAWT and future projects p 148 A83-15929
- RAO, S. A.**
Program of basic research on the utilization of coal-water mixture fuels [DE82-002232] p 106 A83-14299

RAO, T. V. S. N.

Estimation of wave power potential along the Indian coastline p 80 A83-17849

RAPTIS, A. C.

State-of-the-art of acoustic instrumentation for coal-conversion plants [DE82-004037] p 96 N83-12254

RASCH, K. D.

A family of thin high efficiency silicon solar cells p 62 N83-14703
Aspects of end of life design for solar cells p 63 N83-14706

RASHIDOV, I. U. K.

Concerning the improvement of solar heating and cooling systems p 31 A83-15136

RAUH, R. D.

Influence of deposition rate on the character of electrodeposited CdSe used for photoelectrochemical cells p 34 A83-15499

RAUS, V.

Soft X-ray and VUV emission from REB-heated plasma in REBEX 1 and REBEX 1 machines p 152 N83-16130

RAUSCHENBACH, H. S.

Miniaturized Cassegrainian concentrator concept demonstration p 71 N83-15830

RAVI, K. V.

Photovoltaic research needs industry perspective p 40 N83-10516

RAYMOND, M.

Karasek Home, Blackstone, Massachusetts solar-energy-system performance evaluation, Nov 1981 - Mar 1982 [DE82-021302] p 54 N83-12577

READY, W. R.

Northern-climate heat-pump field performance evaluation [DE82-905832] p 12 N83-13402

REAGAN, P.

Thermionic technology for spacecraft power: Progress and problems p 145 N83-15887

REARDON, F. M.

Heat Transfer and Fluid Mechanics Institute, Meeting, 28th, California State University, Sacramento, CA, June 28, 29, 1982, Proceedings p 37 A83-18451

RECKZIEGEL, A.

Production technology of an electrolyte for Na/S batteries [BMFT-FB-T-82-065] p 161 N83-10614

REDZHEPOV, G.

Regulation of the diurnal variation of the cold productivity of an adsorption-type solar refrigeration system p 31 A83-15135

REED, C. W.

Proceedings of a Symposium on High Energy Density Capacitors and Dielectric Materials [PB82-197344] p 160 N83-10373

REED, K. A.

A comparison of unglazed flat plate liquid solar collector thermal performance using the ASHRAE Standard 96-1980 and modified BSE test procedures [PB82-237660] p 58 N83-13632

REES, J.

Controlling energy consumption in single buildings [AD-A118898] p 19 N83-14739

REICHMAN, B.

Layered transition metal thiophosphates /MPX3/ as photoelectrodes in photoelectrochemical cells p 33 A83-15483

REIDINGER, F.

Hydrogen recovery from supplemented natural gas by metal hydrides [DE82-002245] p 76 N83-14303

REIF, H. E.

An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil Part 4 Production of samples of military fuels from raw shale oils [AD-A117526] p 83 N83-10211

REILLY, M. L.

An oxygen flow calorimeter for determining the heating value of kilogram size samples of municipal solid waste p 87 N83-10580

REILLY, R. W.

Economic comparison of CAES designs employing hardrock, salt and aquifer storage reservoirs [DE82-003833] p 167 N83-14758

REINHARDT, D.

Hard coal gasification using catalysts dissolved in steam [BMFT-FB-T-82-107] p 82 N83-10146

REINHART, A.

Air circuit with heat pump [PB82-221219] p 18 N83-14312

RENARD, M. L.

Investigation of engineering and design considerations in selecting conveyors for densified Refuse-Derived Fuel (dRDF) and dRDF Coal mixtures [AD-A119065] p 107 N83-14495

RENFTEL, W.

Flexible gas insulated cable for high power transmission [BMFT-FB-T-82-099] p 158 N83-10370

RENNE, D. S.

Candidate wind-turbine-generator site Data summary [DE82-020416] p 99 N83-12785

RENSHALL, J.

The design of the L-SAT solar array p 66 N83-14730

RENSON, J. E.

Rapid analysis of mineral content of coal Development of an on-line monitoring instrument for pyrite and ash in coal p 86 N83-10571

RENTEUX, J. L.

Fuel savings in air transport p 2 A83-19150

REUTER, R. C., JR.

Contact stresses on a thin plate after large displacements to a full parabolic surface [DE82-005712] p 55 N83-13504

REVERE, W.

Configuration selection study for isolated loads using parabolic dish modules p 45 N83-10548

REX, D.

Optimization of silicon solar cells for solar generators with concentration p 63 N83-14707

RIABIKOV, S. V.

Emission characteristics of refractory materials p 116 A83-16019

RICE, M. P.

The PKI collector p 42 N83-10528

RICE, R. W.

Ceramics for high power sources in space p 171 N83-15881

RICHARDSON, J. H.

Fluidized-bed pyrolysis of oil shale Oil yield, composition, and kinetics [DE82-021010] p 97 N83-12571

RICHARDSON, W. F.

The fabrication and evaluation of a silicon photovoltaic cell with a directly nitrided tunnel insulator p 45 N83-10564

RICHEY, A.

Automotive Stirling engine development program [NASA-CR-167907-2] p 140 N83-15176

RICHEY, A.

Automotive Stirling engine development program [NASA-CR-167907-1] p 140 N83-15177

RICHTER, E.

Laboratory research for desulfurizing and NO-reduction by addition of ammonia under the conditions of the Bergbau-Forschung flue gas desulfurizing process [BMFT-FB-T-82-147] p 9 N83-11617

RIEDLER, W.

Transformation of wind energy by a high-altitude power plant p 117 A83-16112

RIEGEL, C. A.

The satellite power system - Assessment of the environmental impact on middle atmosphere composition and on climate p 2 A83-14517

RIEGLER, G.

Transformation of wind energy by a high-altitude power plant p 117 A83-16112

RINN, C.

TV-SAT solar array p 64 N83-14714

RITTERMAN, P. F.

Deep discharge reconditioning and shorted storage of batteries [NASA-CR-167953] p 120 N83-10502

RIVERA, A. L.

ANFLOW Characterization and development of an energy conserving wastewater treatment system p 4 A83-10585

ROBERTS, A. G.

Fluidized-bed combustion Combustion of run-of-mine coal in a 12-inch-diameter pressurized fluidized-bed combustor [DE82-018786] p 95 N83-12204

ROBERTS, A. S., JR.

Analysis of two-phase flow solar collectors with application to heat pumps p 27 A83-13481

ROBERTS, B. W.

Hybrid thermoelectric solar collector design and analysis p 27 A83-13482

ROBERTS, B. W.

Experiments with a twin rotor, single bladed gyromill p 150 N83-15941

ROBERTSON, H. S.

Collection of solar energy at specified output temperature p 28 A83-13562

ROBSON, R. R.

Advances in series resonant inverter technology and its effect on spacecraft employing electric propulsion [AIAA PAPER 82-1881] p 114 A83-12466

ROCHE, R. H.

Positive displacement rotary vapor compressor for vapor compression [PB82-227620] p 3 N83-10429

RODRIGUEZ, J. L.

Process for high photocurrent in IBC solar cells p 24 A83-12059

ROELKE, R. J.

Cold-air performance of compressor-drive turbine of Department of Energy upgraded automobile gas turbine engine 2 Stage performance [NASA-TM-82818] p 127 N83-11063

ROESSLER, W.

Research and development on a MIS thin film solar cell made of amorphous silicon [BMFT-FB-T-82-079] p 47 N83-10620

ROGALLA, K.

Development of a 5.5 m diameter vertical axis wind turbine, phase 3 [BMFT-FB-T-82-086] p 122 N83-10624

ROGERS, M. L.

Tritium waste control October 1980 - March 1981 [DE82-002088] p 20 N83-14774

ROMANS, J. B.

The effect of additives on the aerosolization of JP-5 jet fuel [AD-A119324] p 106 N83-14294

ROMERO, M.

Analytic tools for the electrical design of solar generators p 66 N83-14727

ROPERTZ, G.

Pressure-swinging underground gasification Theoretical and experimental investigations of gasification, phase 2 [BMFT-FB-T-82-066] p 89 N83-10615

ROSANSKY, M. G.

Primary lithium organic electrolyte battery BA-5588 [AD-A120858] p 146 N83-15900

ROSCHKE, J.

Thermal response of solar receiver aperture plates during sun walk-off [ASME PAPER 82-HT-33] p 25 A83-12791

ROSE, B. H.

Lifetime and effective surface recombination velocity measurements in high-efficiency Si solar cells [DE81-030361] p 74 N83-15953

ROSE, M.

Operational experience on MP-200 series commercial wind turbine generators p 147 N83-15917

ROSEN, J.

Market assessment of photovoltaic power systems for agricultural applications worldwide [NASA-CR-165541] p 56 N83-13585

ROSENBLUTH, M. N.

Stabilization of axisymmetric mirror plasma by energetic ion injections [DE81-030341] p 155 N83-16229

ROSENFELD, C. L.

Applications of remote sensing to wind power facility siting p 77 A83-10041

ROSFJORD, T. J.

Combustion of coal gas fuels in a staged combustor [NASA-TM-82987] p 85 N83-10556

ROSS, B.

Development of an all-metal thick film cost effective metallization system for solar cells [NASA-CR-169635] p 59 N83-14674

ROSS, G. A.

Environmental monitoring of the Athabasca Oil Sands using Landsat data p 79 A83-11988

ROSS, G. A.

Environmental monitoring of the Athabasca Oil Sands Region p 80 A83-14238

ROSS, R.

Landsat for resource evaluation and management in the Alberta foothills p 80 A83-14256

ROSS, R.

Performance criteria for photovoltaic energy systems, volume 1 [DE82-021958] p 56 N83-13596

ROSS, R. G., JR.

Performance criteria for photovoltaic energy systems, volume 2 [DE82-021683] p 56 N83-13597

ROSS, R. G., JR.

Experience with specifications applicable to certification p 32 A83-15463

ROSS, W. A.

Engineering sciences area and module performance and failure analysis area p 41 N83-10523

ROSS, W. A.

Environmental monitoring of the Athabasca Oil Sands using Landsat data p 79 A83-11988

ROSS, W. A.

Environmental monitoring of the Athabasca Oil Sands Region p 80 A83-14238

PERSONAL AUTHOR INDEX

SCHNEIDER, A.

- ROSSING, B. R.**
Materials for high power MHD systems p 144 N83-15872
- ROTHWART, A.**
A p-n heterojunction model for the thin-film
CuInSe₂/CdS solar cell p 30 A83-14513
- ROUX, L.**
The optical properties of titanium nitrides and carbides
Spectral selectivity and photothermal conversion of solar
energy p 33 A83-15490
- ROY, K.**
A family of thin high efficiency silicon solar cells p 62 N83-14703
Aspects of end of life design for solar cells p 63 N83-14706
- ROZSA, R. B.**
Synroc processing options [DE82-004230] p 17 N83-13976
- RUBERG, K.**
Solar availability in cities and towns A computer
model [PB82-202201] p 49 N83-11608
- RUBIN, E. S.**
Program of basic research on the utilization of coal-water
mixture fuels [DE82-002232] p 106 N83-14299
- RUDDMAN, P. S.**
Metallurgy of rechargeable hydrides p 160 A83-11509
- RUFF, R. E.**
An assessment of wind energy resource for
northwestern California p 60 A83-18456
- RUZHADZE, A. A.**
A relativistic plasma microwave generator p 115 A83-15909
- RUNKLE, L. D.**
Block 5 module design summary p 40 N83-10510
Engineering sciences area and module performance and
failure analysis area p 41 N83-10523
- RUSSELL, F. M.**
Heat Storage and Heat Pumps [PB82-226481] p 163 N83-13415
- RUSSELL, M. C.**
Data report for the Northeast Residential Experiment
Station, May 1982 [DE82-020398] p 51 N83-12553
Data report for the Northeast Residential Experiment
Station, Apr 1982 [DE82-021954] p 53 N83-12569
- RYAN, R. V.**
An oxygen flow calorimeter for determining the heating
value of kilogram size samples of municipal solid waste p 87 N83-10580
- RYAN, T. W., III**
Installation of a diesel engine combustion/ignition
evaluation facility [AD-A119610] p 104 N83-14189
- RYAN, W. A.**
A design method for closed loop solar energy systems
with concentrating collectors p 28 A83-13583
- RYBAK, S. C.**
Description of the 3 MW SWT-3 wind turbine at San
Geronimo Pass California p 74 N83-15922

S

- SACHS, I. M.**
Textured solar cell covers for light weight and high
performance p 66 N83-14728
- SAFONOV, M. G.**
Multivariable stability-margin optimisation with
decoupling and output regulation p 2 A83-16191
- SAH, E.**
Solar energy conversion based on the principle of
fluorescent collectors [BMFT-FB-T-82-081] p 47 N83-10621
- SAKATA, I.**
Changes in photovoltaic and dark electrical properties
of hydrogenated amorphous silicon diodes induced by
forward bias carrier injection p 34 A83-16021
- SAKIOTIS, N. G.**
Role of impurities in silicon solar cell performance p 32 A83-15457
- SALEWICZ, A.**
Water demand for generating electricity: A mathematical
programming approach with application in Poland
[IIASA-RR-82-16] p 158 N83-10498
- SALMON, D. J.**
Spectroscopic studies of the hazards of Li/SOCl₂
batteries during anode-limited cell reversal p 114 A83-12056
- SALMON, M.**
Operational considerations on the moon-day project p 38 A83-19148

- SALSICH, J. O.**
Preliminary analysis of wave energy conversion at an
offshore structure [AD-A120079] p 146 N83-15903
- SALTIEL, C.**
Optical analysis of solar energy tubular absorbers p 25 A83-12596
- SALTIEL, C. J.**
Thermal and optical analysis of an evacuated circular
cylindrical concentrating collector p 29 A83-13697
- SALVADOR, P.**
Oxygen evolution improvement at a Cr-doped SrTiO₃
photoanode by a Ru-oxide coating p 33 A83-15493
- SAMOILOV, V. A.**
Testing of the energy module of a parabolocylindrical
solar installation p 31 A83-15130
- SANBORN, J. W.**
Design of a low emission combustor for an automotive
gas turbine [AIAA PAPER 83-0338] p 117 A83-16664
- SANCHEZ, E.**
A new method for experimental determination of the
series resistance of a solar cell p 30 A83-14512
- SANDROCK, G. D.**
Metallurgy of rechargeable hydrides p 160 A83-11509
- SANDUSKY, W. F.**
Candidate wind-turbine-generator site Data summary
[DE82-020416] p 99 N83-12785
- SAPIENZA, R.**
Design and preparation of new, highly active
Fischer-Tropsch catalysts [DE82-003670] p 105 N83-14202
- SAPUPPO, J. S.**
Aerodynamic platform comparison for jet-stream
electricity generation p 116 A83-16102
- SARIN, A.**
Industrial energy use, annual report for 1979 - 1980
[PB82-200585] p 11 N83-12590
Industrial energy use, volume 2 [PB82-200593] p 11 N83-12593
- SAROHIA, V.**
Antimisting kerosene atomization and flammability
[NASA-CR-169385] p 95 N83-12246
Frictional characteristics and heat transfer of antimisting
fuels in tubes [NASA-CR-169388] p 96 N83-12248
- SARRAIL, D.**
Development and testing of a spacecraft surface
potential monitor p 65 N83-14718
- SASSI, G.**
Determination of the interference between the elements
of a central-receiver solar system p 24 A83-11848
Mathematical model for a noniterative optimization of
each system for exploiting solar energy p 24 A83-11849
- SAUER, H. J., JR.**
Advances in energy technology; Proceedings of the
Eighth Annual UMR-DNR Conference on Energy,
University of Missouri-Rolla, Rolla, MO, November 4-7,
1981 p 169 A83-17115
- SAUER, K. L.**
Absorption type water chiller fired directly by waste
heat [BMFT-FB-T-82-129] p 7 N83-11593
- SAUNDERS, A. L.**
Operating experience with the 200 kW MOD-OA wind
turbine generators p 147 N83-15916
- SAUNDERS, N. T.**
Overview of high-temperature materials for high-energy
space power systems p 144 N83-15869
- SAVINOV, A. P.**
A method for analyzing thermionic-converter batteries p 119 A83-19609
- SAWYER, D.**
Development of a polysilicon process based on chemical
vapor deposition, phase 1 [NASA-CR-169633] p 59 N83-14673
- SCANNELL, E. P.**
Perform experiments on LINUS-O and LTX imploding
liquid liner fusion systems [AD-A120052] p 154 N83-16214
- SCARBERRY, R. M.**
Source test and evaluation report: Alcohol facility for
gasohol production [PB82-237041] p 101 N83-13280
- SCARBROUGH, C. A.**
Analytical and experimental analysis of procedures for
testing solar domestic hot water systems [PB82-184839] p 49 N83-12287
- SCARI, R. J.**
Simplified solar fraction estimation for space and water
heating at Department of Defense installations. Appendix
C Water heating nomographs [AD-A120014] p 73 N83-15904

- Simplified solar fraction estimation for space and water
heating at Department of Defense installations. Appendix
B: Space heating nomographs [AD-A120013] p 73 N83-15905
- Simplified solar fraction estimation for space and water
heating at Department of Defense installations
[AD-A120012] p 74 N83-15906
- SCHAAKE, J. C.**
Climatic aspects of planning impoundments and
hydropower operations p 99 N83-12754
- SCHAEFER, S. C.**
Electrochemical determination of Gibbs energies of
formation of cobalt and nickel sulfides [PB82-177304] p 119 N83-10159
- SCHAFFT, H.**
Performance criteria for photovoltaic energy systems,
volume 1 [DE82-021958] p 56 N83-13596
Performance criteria for photovoltaic energy systems,
volume 2 [DE82-021683] p 56 N83-13597
- SCHAFFT, H. A.**
Commercial Photovoltaics Measurements Workshop,
Vail, CO, July 27-29, 1981, Proceedings p 32 A83-15452
- SCHAIKNER, R. B.**
Economic comparison of CAES designs employing
hardrock, salt and aquifer storage reservoirs
[DE82-003833] p 187 N83-14758
- SCHALEGER, L.**
Catalytic liquefaction of biomass [DE82-003329] p 108 N83-14752
- SCHARFF, M. F.**
Computer modeling of mixing and agglomeration in
coal-conversion reactors Volume 1 Model formulation
[DE82-014836] p 84 N83-10212
- SCHAUBERGER, H.**
Stationary flywheel energy storage systems
[PB82-238130] p 165 N83-13637
- SCHPEPEL, S. E.**
Automated probe microdistillation/mass spectrometry
for the analysis of high-molecular weight compounds in
fossil fuels [PB82-022039] p 95 N83-12202
- SCHERBER, W.**
Interaction of electromagnetic radiation and
microstructural materials with regard to the production of
spectral-selective solar absorbers p 37 A83-18497
- SCHERMER, R. I.**
The 30-MJ superconducting magnetic energy storage
for BPA transmission-line stabilizer [DE82-002355] p 165 N83-14414
- SCHERSON, D.**
Electromagnetic studies of redox systems for energy
storage [NASA-CR-169593] p 165 N83-14667
- SCHIENBEIN, L. A.**
Review of DAF Indal VAWT commercialization
programs p 148 N83-15930
- SCHILLING, R.**
Aspects of end of life design for solar cells p 63 N83-14706
- SCHLISSER, S. P.**
Pilot-scale assessment of conventional particulate
control technology for pressurized fluidized-bed
combustion emissions [PB82-230921] p 103 N83-13673
- SCHMELZLE, J.**
Development of a 5.5 m diameter vertical axis wind
turbine, phase 3 [BMFT-FB-T-82-086] p 122 N83-10624
- SCHMID, L. A.**
Use of thermocapillary migration in a controllable heat
valve p 156 A83-16093
- SCHMIDT, G.**
A point focusing collector for an integrated water/power
complex p 44 N83-10541
- SCHMIDT, H. J.**
Three-dimensional fluid and electrodynamic modeling
for MHD DCW channels [AIAA PAPER 83-0464] p 117 A83-16732
Laboratory research for desulfurizing and NO-reduction
by addition of ammonia under the conditions of the
Bergbau-Forschung flue gas desulfurizing process
[BMFT-FB-T-82-147] p 9 N83-11617
- SCHNACK, D. D.**
Multidimensional MHD computations for the
field-reversed theta pinch and the reversed-field pinch
[DE82-004361] p 139 N83-15142
- SCHNEIDER, A.**
An exploratory research and development program
leading to specifications for aviation turbine fuel from whole
crude shale oil Part 4 Production of samples of military
fuels from raw shale oils [AD-A117526] p 83 N83-10211

SCHOENBERG, K. F.
Equilibrium poloidal field distributions in reversed-field-pinch toroidal discharges [DE82-014130] p 134 N83-13996

SCHOENFELD, D. W.
Grown-in defects and defects produced by 1-Me electron irradiated in AlO 3Ga0.7As P-N junction solar cells p 71 N83-15828

SCHOENHALS, R. J.
Thermal energy storage testing facilities [DE82-000110] p 168 N83-15948

SCHOLLE, P. A.
Geological studies of the COST numbers G-1 and G-2 wells, United States north Atlantic outer continental shelf [USGS-CIRC-861] p 94 N83-11638

SCHOLLMEIER, W.
Desulfurization of coal by means of the Batac-jig [BMFT-FB-T-82-100] p 82 N83-10145

SCHRADER, L.
Phototype plant for Nuclear Process Heat (NPH), reference phase R and D work on Hydrogenated Coal Gasification (HCG) Further operation of semi-industrial plant for hydrogenated coal gasification [BMFT-FB-T-82-098] p 90 N83-10625

SCHROCK, V. E.
Use of waste heat in district systems with considerations of seasonal-heat-demand variations [DE82-019923] p 14 N83-13614

SCHROEDER, H.
Fuel savings in air transport p 2 A83-19150

SCHRONK, L. R.
Automated probe microdistillation/mass spectrometry for the analysis of high-molecular weight compounds in fossil fuels [PB82-022039] p 95 N83-12202

SCHRUBEN, J.
Large-area sheet task advanced dendritic web growth development [NASA-CR-169624] p 58 N83-14665
Large-area sheet task advanced dendritic web growth development [NASA-CR-169639] p 59 N83-14669
Large-area sheet task advanced dendritic web growth development [NASA-CR-169637] p 59 N83-14675

SCHUHWEK, W.
Development of a 5.5 m diameter vertical axis wind turbine, phase 3 [BMFT-FB-T-82-086] p 122 N83-10624

SCHULTING, F.
A thermal desorption cold-trap unit for gaschromatographic analysis of gaseous organic pollutants [PB82-206368] p 3 N83-10152

SCHULTZ, D. F.
Combustion of coal gas fuels in a staged combustor [NASA-TM-82987] p 85 N83-10556

SCHULTZ, K. R.
Prospects of low-activation fusion-reactor design [DE82-003198] p 155 N83-16231

SCHUSS, J. J.
Lower-hybrid-heating experiments on the Alcator C and the Versator II Tokamaks [DE82-013874] p 132 N83-13007

SCHWAB, J.
NOx results from two combustors tested on medium BTU coal gas p 78 A83-11493

SCHWARTZ, R. J.
High-intensity solar cells [DE82-020420] p 51 N83-12550

SCHWARZMEIER, J. L.
Ion kinetic effects on the tilt mode in FRCs [DE82-002329] p 155 N83-16227

SCHWEDOCK, J. P.
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil Part 4. Production of samples of military fuels from raw shale oils [AD-A117526] p 83 N83-10211

SCHWEGLER, B. R., JR.
Water hyacinth wastewater treatment system p 88 N83-10586

SCHWEPPE, E.
Alternative electric generation impact simulator [PB82-180324] p 3 N83-10302

SCOTT-MONCK, J.
Progress in developing high performance solar blankets and arrays p 71 N83-15829
A preliminary evaluation of a potential space worth encapsulant p 72 N83-15832
Blanket technology p 72 N83-15838

SCOTT, J. L.
Special-purpose materials for magnetically confined fusion reactors [DE82-005310] p 134 N83-13974

SCOTT, M. H.
Three-dimensional current distribution in coal-fired MHD channels [DE82-016958] p 99 N83-13005

SEALOCK, L. J., JR.
Kinetics and catalysis of producing synthetic gases from biomass [PB82-214347] p 82 N83-10156

SEAMAN, C. H.
Calibration of solar cells by the reference cell method - The spectral mismatch problem p 28 A83-13580

SEAMOUNT, D. T., JR.
Use of wireline logs at Cerro Prieto in identification of the distribution of hydrothermally altered zones and dike locations and their correlation with reservoir temperatures [DE82-001981] p 107 N83-14661

SECORD, N. W.
WECS-load controlled pitch-variable load conversion to heat [DE82-014683] p 121 N83-10602

SEDERQUIST, R. A.
Combustion of coal gas fuels in a staged combustor [NASA-TM-82987] p 85 N83-10556

SEDLACEK, Z.
Power spectrum optimization of the three-waveguide grill for the T-7 Tokamak p 150 N83-16117

SEDY, J.
Energy efficient face seal [NASA-CR-165591] p 21 N83-15659

SEERY, D. J.
Reaction-induced temperature deviations during coal devolatilization in a heated grid [DE82-003864] p 106 N83-14300

SEHNAL, J.
Energy efficient face seal [NASA-CR-165591] p 21 N83-15659

SEIDENSTICKER, R. G.
Large-area sheet task advanced dendritic web growth development [NASA-CR-169624] p 58 N83-14665
Large-area sheet task advanced dendritic web growth development [NASA-CR-169639] p 59 N83-14669
Large-area sheet task advanced dendritic web growth development [NASA-CR-169637] p 59 N83-14675

SEIKEL, G. R.
Potential role and technology status of closed-cycle MHD for light-weight nuclear space-power systems p 142 N83-15853

SELBACH, H.-J.
Research on oxidation by air and tempering of Raney nickel electrocatalysts for the H2 anodes of alkali combustion materials cells p 119 A83-18494

SEMENA, M. G.
The effect of the parameters of metal-fiber capillary structures on the maximum heat-transfer capability of thermal pipes p 156 A83-11515

SENGUPTA, D. L.
Television interference and acoustic emissions associated with the operation of the Darnes VAWT p 149 N83-15934

SENER, D.
Data collection and analysis for geothermal research [PB82-185430] p 97 N83-12390

SERIO, C.
Global solar radiation estimation from relative sunshine hours in Italy p 26 A83-12951

SERWAY, R. A.
Heat-treatment studies on thin-film CdS/Cu₂S solar cells p 35 A83-16084

SETHI, R.
Zinc electrode morphology in alkaline solutions I - Study of alternating voltage modulation on a rotating disk electrode p 115 A83-15867

SEXTON, F. W.
Process for high photocurrent in IBC solar cells p 24 A83-12059

SEYLER, C. E.
Ion kinetic effects on the tilt mode in FRCs [DE82-002329] p 155 N83-16227

SHACKLETON, M.
Measurement of high-temperature high-pressure processes A summary report [PB82-196932] p 98 N83-12667

SHAHEEN, K. E.
Hybrid thermoelectric solar collector design and analysis p 27 A83-13482

SHALTENS, R. K.
Operating experience with the 200 kW MOD-OA wind turbine generators p 147 N83-15916

SHANNON, T. E.
Engineering features of the INTOR conceptual design [DE82-002808] p 156 N83-16232

SHARAN, R.
A simple parameter measurement system for solar cells p 38 A83-18825

SHARIF, M.
Darnes wind-turbine and pump performance for low-lift irrigation pumping [DE82-016270] p 131 N83-12564

SHARMA, J. K.
Effect of off-south orientation on the performance of collector reflector system in India p 30 A83-14671

SHARMA, S. K.
Theory of open circuit photo-voltage in degenerate abrupt p-n junctions p 36 A83-17767

SHARP, J. K.
Designing the manifold piping for parabolic-trough-collector fields [DE82-015998] p 46 N83-10599

SHEBALIN, J. V.
Anisotropy in MHD turbulence due to a mean magnetic field [NASA-TM-84000] p 131 N83-12998

SHEEDY, J. F.
Simplified solar fraction estimation for space and water heating at Department of Defense installations. Appendix C Water heating nomographs [AD-A120014] p 73 N83-15904
Simplified solar fraction estimation for space and water heating at Department of Defense installations. Appendix B Space heating nomographs [AD-A120013] p 73 N83-15905
Simplified solar fraction estimation for space and water heating at Department of Defense installations [AD-A120012] p 74 N83-15906

SHEIBLEY, D. W.
Polyvinyl alcohol membranes as alkaline battery separators [NASA-TM-82961] p 119 N83-10135

SHEPARD, W. S.
Remote sensing of coal-fired MHD by optical diagnostic techniques [AIAA PAPER 83-0469] p 80 A83-16736

SHERLOCK, T. P.
NOx results from two combustors tested on medium BTU coal gas p 78 A83-11493

SHERMAN, F. S.
Investigation of free-forced convection flows in cavity-type receivers [DE82-020118] p 49 N83-12386

SHERMAN, P. M.
Study of the formation of submicron particulates generated by coal combustion [DE82-003268] p 21 N83-15401

SHERWOOD, R. C.
Particle size distribution of Ni microprecipitates in LaNi5 used for hydrogen storage p 75 A83-12295

SHIMIZU, I.
The residual voltage in fast electrophotography of a-SiH_x/x p 34 A83-15511

SHIRLEY, T. E.
Impact of NOx selective catalytic reduction processes on flue gas cleaning systems [PB82-240086] p 16 N83-13664

SHISLER, R. A.
Evaluation of catalytic combustion of actual coal-derived gas [NASA-CR-167842] p 102 N83-13588

SHIYAO, Z.
Physics (selected articles) [AD-A119830] p 154 N83-16143

SHKVARUNETS, A. G.
A relativistic plasma microwave generator p 115 A83-15909

SHLACHTER, J. S.
Behavior of a plasma in a high-density gas-embedded Z-pinch configuration [DE82-017396] p 125 N83-10935

SHOUCRI, M. M.
Radial effects in heating and thermal stability of a sub-ignited Tokamak [DE82-009384] p 124 N83-10932

SHUTE, D. W.
Power conditioning subsystem design [AD-A117736] p 121 N83-10569

SIELAFF, H. D.
Pneumatic stowing with lateral discharge in coal faces with thick seams [BMFT-FB-T-82-074] p 90 N83-10617

SIEMROTH, P.
Crater formation by high current discharges in vacuum p 152 N83-16129

SIEVERS, A. J.
Spectral selectivity of high-temperature solar absorbers II Effects of interference p 33 A83-15488

- SIGRIST, M.**
The optical properties of titanium nitrides and carbides
Spectral selectivity and photothermal conversion of solar energy p 33 A83-15490
- SIKORSKI, W.**
Water demand for generating electricity: A mathematical programming approach with application in Poland [IIASA-RR-82-16] p 158 N83-10498
- SILBERBERG, R. B.**
Energy policy formulation in South Africa: APL as a tool to identify options p 20 N83-14968
- SILBERSTEIN, R. P.**
Hot-electron luminescence in aged electrodeposited CdSe liquid-junction solar cell p 36 A83-16946
- SILVERMAN, S.**
Power requirements for manned space stations p 140 N83-15842
- SIMETKOSKY, M.**
Automotive Stirling engine development program [NASA-CR-167907-2] p 140 N83-15176
Automotive Stirling engine development program [NASA-CR-167907-1] p 140 N83-15177
- SIMMONS, G. M.**
Gasification kinetics for biomass decomposition [PB82-199043] p 97 N83-12256
- SIMON, T. W.**
Heat transfer - A review of 1981 literature p 169 A83-17701
- SIMONS, S.**
The phototron: A light to RF energy conversion device p 143 N83-15866
- SIMPSON, A. F.**
CMX-50: A new ultra thin solar cell cover for lightweight arrays p 66 N83-14726
- SINDEEV, I. M.**
Electric power supply of aircraft p 115 A83-14115
- SINGH, A. J.**
An investigation of deposition parameter dependence of optical properties, microstructure and thermal stability of black chrome selective surfaces p 34 A83-15497
- SINGLETARY, J. H.**
Sewage sludge as a supplementary utility boiler fuel p 88 N83-10590
- SINGLETON, F. D., JR.**
Water demand for generating electricity: A mathematical programming approach with application in Poland [IIASA-RR-82-16] p 158 N83-10498
- SINIAVSKII, V. V.**
A method for analyzing thermionic-converter batteries p 119 A83-19609
- SIROCKY, P. J.**
Measured performance of a tip-controlled, teetered rotor with an NACA 64 sub 3-618 tip airfoil [NASA-TM-82870] p 136 N83-14689
- SIVAPALAN, S.**
Power augmentation in a Savonius-type wind-turbine by using a single air-deflecting vane p 115 A83-14725
- SIVASEGARAM, S.**
Power augmentation in a Savonius-type wind-turbine by using a single air-deflecting vane p 115 A83-14725
- SIZOV, I. M.**
Automatic methods for the adjustment of faceted solar-energy concentrators and heliostats p 31 A83-15131
- SKLAR, H.**
Wind-energy program: FY 1982 third quarterly review [DE82-019928] p 133 N83-13714
- SKOV, A.**
Experiments on the ADAM 1 plant for the optimisation of methanization process in the long distance nuclear energy transmission system test run performed in the spring of 1980 [BLL-T5869/BG/MRS14614/82] p 85 N83-10495
- SLAVIK, J.**
Helium population model p 154 N83-16139
- SLEGEIR, W.**
Design and preparation of new, highly active Fischer-Tropsch catalysts [DE82-003670] p 105 N83-14202
- SLOAN, E. D.**
Liquid-vapor equilibrium for ternary natural gas system [PB82-227679] p 82 N83-10160
- SLOUGH, J. T.**
Production and experimental study of the dissipative trapped ion instability p 123 N83-10910
- SMITH, B. T.**
Layered transition metal thiophosphates /MPX3/ as photoelectrodes in photoelectrochemical cells p 33 A83-15483
- SMITH, D. L.**
Wildcat: A catalyzed D-D Tokamak reactor [DE82-013712] p 125 N83-10938
- SMITH, G. D.**
Flat plate photovoltaic power systems: Description, design and cost [AD-A120814] p 73 N83-15902
- SMITH, H. W.**
A multi-site magnetotelluric measurement system with real-time data analysis [DE82-020596] p 98 N83-12704
- SMITH, J. M.**
End region effects upon the performance of a magnetohydrodynamic channel p 113 A83-10665
NASA Lewis Research Center combustion MHD experiment p 141 N83-15847
- SMITH, R. J.**
Power conditioning unit development for MAG-TRANSIT p 113 A83-11021
- SMOKLER, M. I.**
User handbook for block IV silicon solar cell modules [NASA-CR-169431] p 45 N83-10552
- SNAIL, K.**
A new evacuated CPC collector tube p 37 A83-18558
- SNOW, J. W.**
Wind power assessment along the Atlantic and Gulf Coasts of the United States p 108 N83-14816
- SNYDER, D. B.**
Environmentally induced discharges in a solar array p 36 A83-17493
- SNYDER, M. H.**
Airfoil data for wind turbines p 130 N83-12531
Control systems for horizontal-axis wind turbines p 130 N83-12532
Users manual for WIND p 130 N83-12534
- SOCZAK, I. F.**
Development status of the PDC-1 Parabolic Dish Concentrator p 42 N83-10526
- SOKOLOV, M.**
Optical analysis of solar energy tubular absorbers p 25 A83-12596
Thermal and optical analysis of an evacuated circular cylindrical concentrating collector p 29 A83-13697
- SOLOMON, A. D.**
Mathematical modeling of TES subsystems [DE82-000168] p 168 N83-15950
- SOMMER, H. T.**
Program of basic research on the utilization of coal-water mixture fuels [DE82-002232] p 106 N83-14299
- SOMOANO, R.**
Polymeric metallic electrodes for rechargeable battery applications p 160 A83-11813
- SORENSEN, J. H.**
Alternative means of coping with national energy emergencies [DE82-002812] p 21 N83-15955
- SOTER, S.**
Studies related to the deep earth gas [PB82-227653] p 84 N83-10213
- SOTGIA, G.**
Experimental results of a nonconventional energy conversion pilot facility-thermogravimetric system [CISE-1754] p 103 N83-13629
- SOUBEYRAND, M. J.**
Use of test structures in the production of CdS/Cu₂S photovoltaic devices p 32 A83-15455
- SOUKUP, R. J.**
Diffusion length measurements in solar cells: An analysis and comparison of techniques p 69 N83-15812
- SOUMAORO, O.**
A study of silicon and GaAs solar cells, and their optical coupling by means of a dichroic mirror p 23 A83-11764
- SOUSSELIER, Y.**
Nuclear fuel cycle and waste management in France [DE81-700732] p 104 N83-13975
- SOWELL, R. R.**
Black chrome solar selective coatings optimized for high temperature applications p 33 A83-15479
- SOZZI, R.**
Regional energy planning. Some suggestions to public administration [CISE-1795] p 19 N83-14765
- SPARROW, E. M.**
Heat transfer - A review of 1981 literature p 169 A83-17701
- SPEARS, J. W.**
Lo-Cal, Champaign, Illinois solar-energy-system performance evaluation, Jan 1982 - Apr 1982 [DE82-021299] p 53 N83-12575
- SPEER, J. H., JR.**
Microprocessor control of power sharing and solar array peak power tracking for high power /2.5 kW/ switching power converters p 23 A83-11007
- SPIGHT, C.**
Solar MHD systems with two-phase flow with magnetic liquid metal p 141 N83-15851
- SPITZER, M. B.**
Large area space solar cell assemblies p 68 N83-15810
- SPOONAMORE, J. H.**
CAEDS: Computer-aided engineering and architectural design system [AD-A117972] p 170 N83-11794
- SPOTT, K. H.**
Air circuit with heat pump [PB82-221219] p 18 N83-14312
- SPROTT, J. C.**
Protection of large capacitor banks [DE82-017353] p 120 N83-10366
Poloidal ohmic heating in a multipole [DE82-019888] p 134 N83-13998
- SPROW, F. B.**
Developing technologies for synthetic fuels p 78 A83-10658
- SQUIRES, T. G.**
A systematic investigation of the organosulfur components in coal p 86 N83-10575
- SRIKANTIAH, D. V.**
Remote sensing of coal-fired MHD by optical diagnostic techniques [AIAA PAPER 83-0469] p 80 A83-16736
- SRINIVAS, B.**
Computer modeling of mixing and agglomeration in coal-conversion reactors: Volume 1: Model formulation [DE82-014836] p 84 N83-10212
- SRINIVASAN, S.**
Application of fuel cells to highway and nonhighway transportation [DE82-004365] p 156 N83-16259
- STAATS, P. A.**
Faraday-rotation measurements in ISX-B [DE82-011507] p 127 N83-10953
- STACY, E.**
Physical and chemical characterization of Devonian gas shale [DE82-002560] p 111 N83-15802
- STAHL, J.**
Development of instrumental methods of analysis of sulfur compounds in coal-process streams [DE82-003291] p 20 N83-14776
- STANKEVICS, J. O. A.**
Toroidal flow coal-fired MHD combustor design study and tests [AIAA PAPER 83-0467] p 118 A83-16734
- STANLEY, C. L.**
Pilot-scale assessment of conventional particulate control technology for pressurized fluidized-bed combustion emissions [PB82-230921] p 103 N83-13673
- STAPLES, B. R.**
Thermodynamic data for desulfurization processes [PB82-184904] p 95 N83-12207
- STARLING, K. E.**
Development of geothermal binary-cycle working-fluid properties: Information and analysis of cycles [DE82-021542] p 102 N83-13602
- STARR, M. R.**
Photovoltaic prospects in Europe p 35 A83-16184
- STASEK, G.**
Loss currents of solar cells under Low Earth Orbit (LEO) conditions p 65 N83-14721
- STAUB, W. P.**
Geothermal-resource survey of the Tennessee Valley Region [DE82-021951] p 98 N83-12706
- STAVINOH, L. L.**
Assessment/review of methanol technology and utilization as a fuel [AD-A120109] p 109 N83-15489
- STAVINOH, P.**
Computer simulations of reflex E-beam systems and plasma stability p 151 N83-16123
- STEDMAN, J. K.**
Alkaline fuel cells for prime power and energy storage p 167 N83-15845
- STEFANAKOS, E. K.**
Solar-cell testing and evaluation [DE82-016179] p 52 N83-12562
- STEIN, H. J.**
Prototype solar house: Study of the scientific evaluation and feasibility of a research and development project [BMFT-FB-T-82-137] p 49 N83-11598
- STEIN, R. J.**
Longwall shearer tracking system [NASA-CASE-MFS-25717-1] p 107 N83-14607
- STEINBERG, M.**
Flash hydrolysis of coal for conversion to liquid and gaseous fuels [DE82-019435] p 100 N83-13197
- STEINBERGER, W.**
Study of the possibilities of more rational use of energy in the sector of trade and commerce, part 1 [BMFT-FB-T-82-076-PT-1] p 5 N83-10618

T

- Study of the possibilities of more rational use of energy in the sector of trade and commerce, part 2
[BMFT-FB-T-82-077-PT-2] p 7 N83-11591
- STEINER, D.**
Investigation of heat storage for temperature range from 200 to 500 C
[BMFT-FB-T-82-105] p 161 N83-10627
- STELLA, P. M.**
Simulated space flight testing of commercial terrestrial silicon cells p 69 N83-15811
The course of solar array welding technology development p 72 N83-15831
- STELLER, P.**
Technical study on the possibilities of oil shale combustion in a fluidized bed furnace including cost estimates for a plant to be built
[BMFT-FB-T-82-085] p 90 N83-10623
- STEPHENSON, J. W.**
Energy recovery and cogeneration from an existing municipal incinerator p 5 N83-10589
- STETIU, P.**
Polycrystalline p-WSe₂ as photocathode in an electrochemical solar cell p 29 A83-13702
- STEVENS, L. W.**
Thermal energy storage testing facilities
[DE82-000110] p 168 N83-15948
- STEVENSON, C. D.**
Improving energy efficiency of major weapon systems
[AD-A119563] p 18 N83-14116
- STEWART, C. C.**
Toroidal flow coal-fired MHD combustor design study and tests
[AIAA PAPER 83-0467] p 118 A83-16734
- STEWART, C. S.**
Transient flow analysis of the AEDC/HPDE MHD generator
[AIAA PAPER 83-0395] p 117 A83-16691
- STEWART, D. A.**
Evaluation of short-term NO₂ plume models for point sources Volume 1 Technical discussion
[PB82-234329] p 16 N83-13658
- STEWART, W. F.**
Superconducting-transmission-line project at the Los Alamos National Laboratory
[DE82-021835] p 158 N83-12344
- STICKEL, R. E.**
Remote sensing of coal-fired MHD by optical diagnostic techniques
[AIAA PAPER 83-0469] p 80 A83-16736
- STIELSTRA, P. B.**
Positive displacement rotary vapor compressor for vapor compression
[PB82-227620] p 3 N83-10429
- STINSON, J. M.**
The Tennessee Valley Authority's biomass fuels program
[DE81-904161] p 109 N83-15495
- STOECKEL, J.**
Lower-hybrid heating experiment on the TM-1-MH Tokamak p 150 N83-16116
Energy balance in TM-1-MH Tokamak (ohmic heating) p 151 N83-16122
- STONE, J. C.**
Water demand for generating electricity A mathematical programming approach with application in Poland
[IASA-RR-82-16] p 158 N83-10498
- STRASZHEIM, W.**
Microstructure of coal p 87 N83-10576
- STREED, E. R.**
Incident angle modifiers for flat-plate solar collectors - Analysis of measurement and calculation procedures p 27 A83-13480
- STRELKOV, P. S.**
A relativistic plasma microwave generator p 115 A83-15909
- STRELKOV, V. S.**
Tokamak research in the Soviet Union p 150 N83-16115
- STRINGFELLOW, G. B.**
Analysis of defect structure in silicon Characterization of samples from UCP ingot 5848-13C
[NASA-CR-169617] p 60 N83-14680
- STRUMPF, H. J.**
High-temperature ceramic heat exchanger element for a solar thermal receiver p 26 A83-13476
High-temperature ceramic heat exchanger element for a solar thermal receiver p 44 N83-10543
A high temperature ceramic heat exchanger element for a solar thermal receiver
[NASA-CR-169625] p 58 N83-14666
- STRZONDALA, V.**
Electron impact ionization of highly charged molybdenum impurities in Tokamak plasmas p 151 N83-16119
- SUBKLEW, G.**
Pressure-swinging underground gasification
Theoretical and experimental investigations of gasification, phase 2
[BMFT-FB-T-82-066] p 89 N83-10615
- SUEKER, K. H.**
Design and testing of a 13.75 MW converter for a superconducting magnetic-energy-storage system
[DE82-002385] p 166 N83-14749
- SULIMMA, A.**
Coal gasification of steam-soluted catalyst
[BMFT-FB-T-82-073] p 81 N83-10143
- SULLIVAN, K. D.**
Radar and infrared remote sensing of geothermal features at Pilgrim Springs, Alaska p 79 A83-12036
- SULLIVAN, T. L.**
A review of resonance response in large, horizontal-axis wind turbines p 114 A83-13696
- SULLIVAN, W. N.**
Structural-dynamic-response characteristics of Darrieus vertical axis wind turbines p 135 N83-14545
Structural dynamic response characteristics of Darrieus vertical axis wind turbines p 148 N83-15932
- SUNDAR, V.**
Estimation of wave power potential along the Indian coastline p 80 A83-17849
- SUNDARAM, M. S.**
Flash hydrolysis of coal for conversion to liquid and gaseous fuels
[DE82-019435] p 100 N83-13197
- SUNDBERG, G. R.**
Deep impurity trapping concepts for power semiconductor devices p 170 N83-15877
- SUPPA, E. G.**
Announcement of an opportunity for space calibration of solar cells p 65 N83-14719
- SUPPER, W.**
Transient shutdown of an axial-groove liquid trap heat pipe thermal diode p 157 A83-19161
- SUREK, T.**
Evaluation of advanced R and D topics in photovoltaics p 41 N83-10518
- SUTTON, W. A.**
Refining of military jet fuels from shale oil Part 1 Preliminary process design, economic and yield optimization, and computer modeling
[AD-A117511] p 83 N83-10210
- SUZUKI, T.**
Characteristics of a Savonius windmill power system with a synchronous generator p 115 A83-15797
- SVEJDA, B.**
Equidensitometrical evaluation of a film record of an SF₆ switching arc p 153 N83-16136
- SVIATOSLAVSKY, I. N.**
Conceptual design for a modular-stellarator fusion-reactor magnet
[DE82-002863] p 138 N83-15135
- SWALLOM, D. W.**
Magnetohydrodynamic power supply systems for space applications p 141 N83-15852
- SWANBERG, C. A.**
A groundwater convection model for Rio Grande rift geothermal resources p 79 A83-11831
- SWANENBURG, R.**
The design of the L-SAT solar array p 66 N83-14730
- SWARTZ, C. K.**
Radiation damage in front and back illuminated high resistivity silicon solar cells
[NASA-TM-82965] p 48 N83-10962
Effects of processing and dopant on radiation damage removal in silicon solar cells p 63 N83-14708
Radiation damage and annealing in large area n+/p/p+ GaAs shallow homojunction solar cells p 71 N83-15826
- SWEGLE, J. A.**
Beam and deposition stability in light-ion fusion targets
[DE82-017768] p 134 N83-13993
- SWIFT, A. H. P.**
Atmospheric testing of a two bladed furl controlled wind turbine with passive cyclic pitch variation p 149 N83-15938
- SWIFT, R. N.**
Experimental feasibility of the airborne measurement of absolute oil fluorescence spectral conversion efficiency p 169 A83-18581
- SWIMM, R. T.**
Optical absorption coefficient and minority carrier diffusion length measurements in low-cost silicon solar cell material p 30 A83-13922
- SYMONDS, R. A.**
Evaluation of advanced combustion concepts for dry NO sub x suppression with coal-derived, gaseous fuels
[NASA-TM-82985] p 85 N83-10557
- TACINA, R. R.**
Catalytic combustion with steam injection
[NASA-TM-82923] p 111 N83-15805
- TADA, H. Y.**
Solar cell radiation handbook
[NASA-CR-169662] p 61 N83-14687
- TAKASE, Y.**
Lower-hybrid-heating experiments on the Alcator C and the Versator II Tokamaks
[DE82-013674] p 132 N83-13007
- TALAAT, M. E.**
Thermal storage performance calculations by closed form and finite difference solutions
[ASME PAPER 82-HT-52] p 26 A83-12799
- TAMBA, M.**
Analysis of target implosion irradiated by proton beam 1 Beam interaction with target plasma
[IPJP-612] p 134 N83-13989
- TAN, C. P.**
Performance of the Wells turbine at starting p 113 A83-10661
- TANAKA, M.**
Thermal analysis of the position of the freezing front around an LNG in-ground storage tank with a heat barrier p 110 N83-15712
- TANG, R.**
NO_x formation experiments in an MHD simulation facility p 116 A83-16103
- TANNER, R. I.**
Transient performance of evacuated tubular solar collectors p 27 A83-13478
- TANZER, H. J.**
Fabrication and development of several heat pipe honeycomb sandwich panel concepts
[NASA-CR-165962] p 170 N83-10379
- TARNIZHEVSKII, B. V.**
Testing of the energy module of a parabolocylindrical solar installation p 31 A83-15130
- TASEVOLI, M.**
OAO-3 end of mission power subsystem evaluation
[NASA-TM-83959] p 161 N83-11580
- TAWADA, Y.**
Valency control of glow discharge produced a-SiC:H and its application to heterojunction solar cells p 28 A83-13649
- TAYLOR, H.**
CMX-50 A new ultra thin solar cell cover for lightweight arrays p 66 N83-14726
- TAYLOR, J. R.**
Fluidized-bed pyrolysis of oil shale Oil yield, composition, and kinetics
[DE82-021010] p 97 N83-12571
- TAYLOR, W.**
Development of technique for AR coating nickel and copper metallization of solar cells FPS project product development
[NASA-CR-169616] p 60 N83-14679
- TAYLOR, W. D.**
Utilizing subcooled, superfluid He-II in the design of a 12-Tesla tandem-mirror experiment
[DE82-003322] p 138 N83-15133
- TEAGAN, W. P.**
Liquid ribbon radiator for lightweight space radiator systems p 145 N83-15895
- TEEPLE, F. E.**
Research, development and demonstration in the design of sanitary landfill to optimize the generation and capture of compressible gas p 89 N83-10595
- TEMPLE, P. I.**
Study of photovoltaic residential retrofits Volume 1 Executive summary
[DE82-015793] p 46 N83-10605
- TEMPLE, P. L.**
Study of photovoltaic residential retrofits Volume 2 Main report
[DE82-015626] p 53 N83-12566
- TEMPLIN, R. J.**
Measurements on the Magdalen Islands VAWT and future projects p 148 N83-15929
- TENG, K. W.**
Grown-in defects and defects produced by 1-Me electron irradiation in Al_{0.3}Ga_{0.7}As P-N junction solar cells p 71 N83-15828
- TENNEY, D. R.**
Materials technology for large space structures p 171 N83-15882
- TENTSCHER, K. H.**
A family of thin high efficiency silicon solar cells p 62 N83-14703
- TERASAWA, K. L.**
Potential benefits from a successful solar thermal program p 3 N83-10547

- TERAZONO, S.-I.**
The residual voltage in fast electrophotography of a-SiH_x/x p 34 A83-15511
- TERLIZZI, C. P.**
Analytical and experimental analysis of procedures for testing solar domestic hot water systems [PB82-184839] p 49 N83-12287
- TESCHKE, O.**
Operation of a steady-state pH-differential water electrolysis cell p 75 A83-16041
- TEXTER, S.**
Lower-hybrid-heating experiments on the Alcator C and the Versator II Tokamaks [DE82-013674] p 132 N83-13007
- THALLER, L. H.**
Pore size engineering applied to starved electrochemical cells and batteries [NASA-TM-82893] p 119 N83-10134
Expected cycle life versus depth of discharge relationships of well behaved single cells and cell strings [NASA-TM-82957] p 160 N83-10558
- THEMELIS, M. P.**
PV module degradation-analysis [DE82-021123] p 53 N83-12570
- THIAGARAJAN, V.**
Extremal MHD generator p 117 A83-16110
- THIBAudeau, G.**
Radial effects in heating and thermal stability of a sub-ignited Tokamak [DE82-009384] p 124 N83-10932
- THIELHEIM, K. O.**
Primary energy Present status and future perspectives p 79 A83-14120
- THIESSEN, A. R.**
Heavy-ion inertial fusion Initial survey of target gain versus ion-beam parameters [NASA-TM-82969] p 138 N83-15117
- THINH, N. D.**
An analytical investigation of mass flow, pressure and temperature in a flat-plate solar collector p 37 A83-18452
- THOMAS, M. G.**
Effects of solvent composition and concentration on early liquefaction reactions [DE82-004136] p 109 N83-15395
- THOMAS, R. L.**
DOE/NASA Lewis large wind turbine program [NASA-TM-82991] p 136 N83-14690
The NASA Lewis large wind turbine program p 146 N83-15911
- THOMAS, S. R.**
The MFTF-B plasma diagnostic system [DE82-002594] p 155 N83-16228
- THOMAS, W. C.**
Incident angle modifiers for flat-plate solar collectors - Analysis of measurement and calculation procedures p 27 A83-13480
Analytical and experimental analysis of procedures for testing solar domestic hot water systems [PB82-184839] p 49 N83-12287
- THOMPSON, J. D.**
Superconducting-transmission-line project at the Los Alamos National Laboratory [DE82-021835] p 158 N83-12344
- THOSTENSEN, T.**
Development status of the PDC-1 Parabolic Dish Concentrator p 42 N83-10526
- THROOP, A. L.**
The MFTF-B plasma diagnostic system [DE82-002594] p 155 N83-16228
- TIEDJE, T.**
Meaning of the photovoltaic band gap for amorphous semiconductors p 25 A83-12287
- TIMBARIO, T. J.**
Status of alcohol-fuels-utilization technology for highway transportation A 1981 perspective Volume 1 Spark-ignition engines [DE82-020493] p 96 N83-12255
- TLUCHOR, Z.**
Global model of a hybrid Tokamak reactor with an auxiliary RF heating p 153 N83-16137
- TO, W. M.**
Investigation of free-forced convection flows in cavity-type receivers [DE82-020118] p 49 N83-12386
- TOAZ, R. D.**
Antimisting kerosene atomization and flammability [NASA-CR-169385] p 95 N83-12246
- TODA, N.**
An experimental study of an aerodynamically optimum windmill [NAL-TR-698] p 129 N83-12522
- TOLMAN, D.**
Exploration for fractured petroleum reservoirs using radar/Landsat merge combinations p 77 A83-10031
- TOMAZIC, W. A.**
Assessment of alternative power sources for mobile mining machinery [NASA-TM-82695] p 136 N83-14691
- TOMEI, G.**
Test results of a medium temperature solar engine p 115 A83-16000
- TOMICH, R. S.**
Petrographic evaluation of pyrite in the products from two-stage coal-pyrite flotation [DE82-003593] p 105 N83-14208
- TOMKIEWICZ, M.**
Transport properties of Nafion membranes for use in three-electrode photoelectrochemical storage cells p 160 A83-12055
Hot-electron luminescence in aged electrodeposited CdSe liquid-junction solar cell p 36 A83-16946
- TOOR, E. W.**
Program of basic research on the utilization of coal-water mixture fuels [DE82-002232] p 106 N83-14299
- TOWNSEND, F. M.**
Alcoa ALVAWT program p 148 N83-15928
- TRAVIS, B. J.**
Numerical simulation of fluid flow in porous/fractured media [DE82-002631] p 107 N83-14454
Analysis of preburn three-dimensional flow patterns in underground coal conversion [DE82-002405] p 110 N83-15496
- TREAT, N. L.**
Geothermal-resource survey of the Tennessee Valley Region [DE82-021951] p 98 N83-12706
- TRESSO, E.**
Research on the characteristic parameters of thermophotovoltaic /TPV/ converter performance p 24 A83-12029
Evaluation of thermophotovoltaic conversion efficiency p 35 A83-16086
- TREXLER, D. T.**
Low- to moderate-temperature geothermal resource assessment for Nevada Area specific studies, Pumpernickel Valley, Carlin and Moana [DE82-018598] p 98 N83-12584
- TRIOLLO, R.**
Chemicals enhanced oil recovery [DE82-003475] p 105 N83-14206
- TRIULZI, C.**
The experience collected in the management of the Centro Informazioni Studi Esperienze (CISE) radioactive waste from 1960 to 1980 [CISE-1738] p 17 N83-13977
- TROTH, D. L.**
Multifuel evaluation of rich/quench/lean combustor [NASA-TM-82986] p 86 N83-10559
- TROTTER, D. M., JR.**
Spectral selectivity of high-temperature solar absorbers II Effects of interference p 33 A83-15488
- TRUMBLE, T. M.**
Cold crucible Czochralski for solar cells p 70 N83-15824
- TSAI, M. C.**
Role of tin catalysts in the hydroliquefaction of coal p 81 N83-10131
- TSANG, W.**
Characterization of RDF properties through high pressure differential scanning calorimetry p 87 N83-10582
- TSAO, Y. S.**
The wind program in a typhoon environment p 148 N83-15927
- TSUCHIDATE, H.**
Non-circular bumpy torus [IPPJ-607] p 134 N83-13990
- TSUSHIMA, A.**
Non-circular bumpy torus [IPPJ-607] p 134 N83-13990
- TSUTSUE, M.**
Metal chelate catalysts for fuel cells [PB82-195637] p 131 N83-12592
- TUCKER, H. E.**
Helios movable Hartmann ball [DE82-000756] p 155 N83-16220
- TUNC, S.**
Critical relationships for displacement processes in oil fields [BMFT-FB-T-82-093] p 84 N83-10479
- TURCHI, P. J.**
Research needs Prime-power for high energy space systems [AD-A119243] p 135 N83-14156
Proceedings of the AFOSR Special Conference on Prime-Power for High Energy Space Systems, volume 1 [AD-A118887] p 140 N83-15841
- Proceedings of the AFOSR Special Conference on Prime-Power for High Energy Space Systems, volume 2 [AD-A118888] p 143 N83-15860
- TURCO, R. P.**
The satellite power system - Assessment of the environmental impact on middle atmosphere composition and on climate p 2 A83-14517
- TURMAN, B. N.**
Pulsed power for inertial-confinement fusion [DE82-001991] p 137 N83-15116
- TURNER, D. L.**
Radar and infrared remote sensing of geothermal features at Pilgrim Springs, Alaska p 79 A83-12036
- TURNER, G.**
NASA solar array flight experiment p 65 N83-14722
- TURNER, R. D.**
Design and testing of a 13.75 MW converter for a superconducting magnetic-energy-storage system [DE82-002385] p 166 N83-14749
- TURNER, W. C.**
Plasma parameter measurements using neutral-particle-beam attenuation [DE82-021120] p 132 N83-13001
- TWITCHELL, G.**
Data collection and analysis for geothermal research [PB82-185430] p 97 N83-12390

U

- ULLSCHMIED, J.**
Dynamical model of an overheated magnetized plasma p 152 N83-16131
- ULMER, R.**
Market assessment of photovoltaic power systems for agricultural applications worldwide [NASA-CR-165541] p 56 N83-13585
- UMPHREY, H. R.**
Computer management of geologic and petroleum data at the North Dakota Geological Survey [DE82-904385] p 103 N83-13694
- URBAIN, G.**
TV-SAT solar array p 64 N83-14714
- UYEHARA, C. A.**
Diesel combustion analysis using rapid sampling techniques [AD-A119658] p 104 N83-14192
- UYEHARA, O. A.**
Alcohol as a fuel for farm and construction equipment [DE82-021022] p 100 N83-13277

V

- VACHON, W. A.**
Wind power for the electric-utility industry Policy incentives for fuel conservation p 1 A83-11896
- VALCO, G. J.**
Planar multijunction high voltage solar cell chip p 30 A83-13923
- VALENCIA, F. A.**
Superconducting-transmission-line project at the Los Alamos National Laboratory [DE82-021835] p 158 N83-12344
- VALENTAN, D.**
Development and testing of a spacecraft surface potential monitor p 65 N83-14718
- VALERIANO, D. D. M.**
Automatic interpretation of MSS-LANDSAT data applied to coal refuse site studies in southern Santa Catarina State, Brazil [E83-10066] p 18 N83-14575
- VALGORA, M. E.**
Optimal sun-alignment techniques of large solar arrays in electric propulsion spacecraft [AIAA PAPER 82-1898] p 25 A83-12475
- VALIGNAT, J.**
Optical properties of gold-magnesia selective cermets p 33 A83-15482
- VANBRUSSEL, G. J. W.**
Aerodynamic research on tipvane wind turbines [VTH-LR-355] p 128 N83-11603
- VANDERAUWERA, L.**
Wind power potential in Belgium [PUBL-SER-B-115] p 86 N83-10563
- VANDERSLUIS, K. L.**
Faraday-rotation measurements in ISX-B [DE82-011507] p 127 N83-10953
- VANDEVENDER, J. P.**
Pulsed power for inertial-confinement fusion [DE82-001991] p 137 N83-15116
- VANHEEK, K. H.**
Coal gasification of steam-soluted catalyst [BMFT-FB-T-82-073] p 81 N83-10143

- Steam gasification of coal, project prototype plant nuclear process heat Report at the end of the reference phase
[BMFT-FB-T-82-069] p 90 N83-10616
- VANHOLTEN, T.**
Aerodynamic research on upvane wind turbines
[VTH-LR-355] p 128 N83-11603
- VANKA, S. P.**
Coupled three-dimensional flow and electrical calculations for Faraday MHD generators
p 117 A83-16107
- VANKUIK, G. A. M.**
Aerodynamic research on tipvane wind turbines
[VTH-LR-355] p 128 N83-11603
- VANOVERSTRAETEN, R.**
Lift off A very fine front metallization geometry technique for high efficiency solar cells
p 62 N83-14701
- VANSICIVER, S. W.**
Conceptual design for a modular-stellarator fusion-reactor magnet
[DE82-002863] p 138 N83-15135
- VAS, I. E.**
Fifth Biennial Wind Energy Conference and Workshop (WW5)
[DE82-014659] p 146 N83-15908
The SERI wind energy program p 21 N83-15915
- VASULOW, D.**
The Doublet III Thomson-scattering-system hemiconcentric triplet lens
[DE82-017384] p 123 N83-10908
- VATH, J. E.**
USDOE activities in low-level radioactive waste treatment
[DE82-001450] p 22 N83-16195
- VATSKY, A.**
A conceptual study of the potential for automotive-derived and free-piston Stirling engines in 30- to 400-kilowatt stationary power applications
[NASA-CR-165274] p 121 N83-10568
- VAUGHAN, J. D.**
Liquid phase thermochemical energy conversion systems - An application of Diels-Alder chemistry
p 118 A83-17149
- VEEFKIND, A.**
Effect of radiation and non-Maxwellian electron distribution on relaxation processes in an atmospheric cesium seeded argon plasma
[EUT-82-E-124] p 140 N83-15144
- VENIER, C. G.**
A systematic investigation of the organosulfur components in coal
p 86 N83-10575
- VENKATASETTY, H. V.**
Lithium-sulfur dioxide (Li/SO₂) battery safety hazards Thermal studies
[AD-A119381] p 163 N83-13591
- VENTER, J. A.**
The prediction of the thermal performance of building by the CR-method
[CSIR-BRR-396] p 161 N83-11578
- VERMES, G.**
NOx results from two combustors tested on medium BTU coal gas
p 78 A83-11493
- VEITTE, A. A.**
The STD/MHD codes - Comparison of analyses with experiments
p 116 A83-16105
- VIELEERS, A.**
Further developments of the ECS solar array
p 64 N83-14715
- VIELEERS, A. M. V.**
Extendible and retractable masts for solar array developments
p 65 N83-14725
- VILLERMAUX, J.**
Production of hydrogen by direct thermal decomposition of water - Preliminary investigations
p 75 A83-16042
- VISENTIN, R.**
A parametric analysis of the performances of a linear collectors' network of a solar power plant
p 36 A83-18139
- VLAD, M.**
A time resolving method for determining the energy spectrum of neutrons emitted by a plasma focus device
p 153 N83-16133
- VOECKS, G. E.**
Catalytic autothermal reforming increases fuel cell flexibility
p 74 A83-11794
- VOGT, W. G.**
Demonstration of landfill gas enhancement techniques in landfill simulators
p 88 N83-10594
- VOLLAN, A.**
Development of a 5.5 m diameter vertical axis wind turbine, phase 3
[BMFT-FB-T-82-086] p 122 N83-10624
- VOROBIEV, O. S.**
Emission characteristics of refractory materials
p 116 A83-16019
- VORWERK, M.**
Experiments on the ADAM 1 plant for the optimisation of methanization process in the long distance nuclear energy transmission system test run performed in the spring of 1980
[BLL-T5869/BG/MRS14614/82] p 85 N83-10495
- VRBA, P.**
Simulation code of relativistic electron beam diodes
p 153 N83-16138
- W**
- WADE, J. E.**
Applications of remote sensing to wind power facility siting
p 77 A83-10041
- WAGNER, H. J.**
Prototype solar house Study of the scientific evaluation and feasibility of a research and development project
[BMFT-FB-T-82-137] p 49 N83-11598
- WAITE, W.**
Exploration for fractured petroleum reservoirs using radar/Landsat merge combinations
p 77 A83-10031
- WAKSMAN, D.**
Incident angle modifiers for flat-plate solar collectors - Analysis of measurement and calculation procedures
p 27 A83-13480
- WALBRIDGE, E. W.**
Prime power for high-energy space systems Certain research issues
p 143 N83-15863
- WALENZIK, C.**
Desulfurization of coal by means of the Batac-jig
[BMFT-FB-T-82-100] p 82 N83-10145
- WALKDEN, M. W.**
Omnidirectional proton radiation of thin and thick solar cells
p 63 N83-14709
Electron and photon degradation of boron doped FZ silicon solar cells
p 64 N83-14711
- WALKER, J. A.**
Characterization of RDF properties through high pressure differential scanning calorimetry
p 87 N83-10582
- WALLA, P. S.**
A lightweight electronically commutated dc motor for electric passenger vehicles
[NASA-CR-165601] p 119 N83-10348
- WALSH, J. J.**
Demonstration of landfill gas enhancement techniques in landfill simulators
p 88 N83-10594
- WALSH, S. K.**
An efficient fully implicit simulator
[CSS-126] p 109 N83-15322
- WAMPLER, W. R.**
Deuterium flux measurements in the edge plasmas of PLT and PDX during auxiliary heating experiments
[DE82-001909] p 139 N83-15143
- WANG, C.-H.**
The influence of the interface state on the properties of solar cell semiconductor electrodes
p 26 A83-13473
- WANG, F.-C.**
Transport mechanisms for Mg/Zn3P2 junctions
p 35 A83-16071
- WANG, K. L.**
Progress toward thin-film GaAs solar cells using a single-crystal Si substrate with a Ge interlayer
p 69 N83-15817
- WANG, S. T.**
Stability and disturbance of large dc superconducting magnets
[DE82-012388] p 122 N83-10879
- WANG, S. Y.**
End region effects upon the performance of a magnetohydrodynamic channel
p 113 A83-10665
- WANG, W. L.**
Defects and annealing studies in 1-MeV electron irradiated (AlGa)As-GaAs solar cells
p 70 N83-15822
- WANG, W. Y.**
The heat capacity of coal chars
p 83 N83-10206
- WANXI, C.**
Study of the freezing pressure acting on a shaft lining
p 110 N83-15732
- WARNER, J. S.**
Analytical techniques for aromatic components in aircraft fuels
[AD-A118838] p 96 N83-12252
- WASHOMB, B.**
Commercialization of parabolic dish systems
p 44 N83-10540
Panel discussions Industrial support sector requirements
p 4 N83-10550
- WASSERBAUER, C. A.**
Analysis of combustion spectra containing organ pipe tone by cepstral techniques
[NASA-TM-83034] p 77 N83-16153
- WAT, J.**
Frictional characteristics and heat transfer of antimisting fuels in tubes
[NASA-CR-169388] p 96 N83-12248
- WATANABE, O.**
Thermal analysis of the position of the freezing front around an LNG in-ground storage tank with a heat barrier
p 110 N83-15712
- WATERLAND, L. R.**
Environmental assessment of stationary source NOx control technologies
[PB82-249350] p 16 N83-13665
- WATSON, G. K.**
Microstructural analysis of solar cell welds
p 72 N83-15833
- WEBB, J. B.**
Effect of hydrogen on the deposition rate for planar RF magnetron sputtering of hydrogenated amorphous silicon
p 35 A83-16082
- WEBER, S. L.**
Kinetics and catalysis of producing synthetic gases from biomass
[PB82-214347] p 82 N83-10156
- WEGNER, M.**
Study of the possibilities of more rational use of energy in the sector of trade and commerce, part 1
[BMFT-FB-T-82-076-PT-1] p 5 N83-10618
Study of the possibilities of more rational use of energy in the sector of trade and commerce, part 2
[BMFT-FB-T-82-077-PT-2] p 7 N83-11591
- WEHR, A. G.**
NOx formation experiments in an MHD simulation facility
p 116 A83-16103
- WEIBEL, R. T.**
Advanced high-temperature thermal energy storage media for industrial applications
[DE82-000161] p 168 N83-15945
- WEIN, W.**
Steam generator with circulating atmospheric fluidized bed combustion
[BMFT-FB-T-82-134] p 94 N83-11596
- WEINBERG, I.**
Radiation damage in front and back illuminated high resistivity silicon solar cells
[NASA-TM-82965] p 48 N83-10962
Effects of processing and dopant on radiation damage removal in silicon solar cells
p 63 N83-14708
Radiation damage
p 72 N83-15837
- WEINGART, J.**
Harnessing the Sun for development Actions for consideration by the international community at the UN Conference on New and Renewable Sources of Energy for promoting the use of renewable energy in developing countries
[DE82-020273] p 52 N83-12558
- WEINZIERI, K.**
Basic engineering of a 10 t/hr prototype plant for the Vereinigte Elektrizitätswerke Westfalen (VEW) coal conversion process
[BMFT-FB-T-82-114] p 101 N83-13378
- WEIS, P.**
Safety data for small wind systems
[DE82-015400] p 131 N83-12565
- WEISE, B. R.**
Geologic studies of geopressured and hydrogeopressured zones in Texas Test well site selection
[PB82-220542] p 94 N83-11653
- WEISE, M. R.**
NECAP 4.1 NASA's Energy Cost Analysis Program thermal response factor routine
[NASA-CR-165982] p 4 N83-10562
- WEIZER, V. G.**
The effect of Ta₂O₅ on the interaction between silicon and its contact metallization
[NASA-TM-82948] p 45 N83-10554
On the cause of the flat-spot phenomenon observed in silicon solar cells at low temperatures and low intensities
p 63 N83-14705
- WELCH, K. M.**
Solar-energy-system performance evaluation, Cathedral Square, Burlington, Vermont, July - December 1981
[DE82-016999] p 52 N83-12563
Telluride School, Telluride, Colorado solar-energy-system performance evaluation, February 1982 - April 1982
p 54 N83-12585
- WELSH, J. H.**
Computerized, remote monitoring systems for underground coal mines Fires and explosive atmospheres
[PB82-221359] p 3 N83-10481
- WELTE, D.**
Development of a 5.5 m diameter vertical axis wind turbine, phase 3
[BMFT-FB-T-82-086] p 122 N83-10624

- WEN, L.**
Thermal response of solar receiver aperture plates during sun walk-off
[ASME PAPER 82-HT-33] p 25 A83-12791
- WENDELL, L. L.**
The wind characteristics program p 111 N83-15910
- WENKAM, C. R.**
Geological studies of the COST numbers G-1 and G-2 wells, United States north Atlantic outer continental shelf [USGS-CIRC-861] p 94 N83-11638
- WENNERHOLM, H.**
Durability of solar collectors Experience from surveys of Swedish solar collector installations, 1979 - 1980 [PB82-188095] p 49 N83-11605
- WENTZEL, J. D.**
The prediction of the thermal performance of building by the CR-method [CSIR-BRR-396] p 161 N83-11578
- WERNER, H.**
Economical optimized thermal insulation in buildings [BMFT-FB-T-82-131] p 8 N83-11594
- WESSOL, D. E.**
Methods to enhance blanket power density [DE82-017467] p 127 N83-10958
- WEST, K. W.**
Particle size distribution of Ni microprecipitates in LaNi₅ used for hydrogen storage p 75 A83-12295
- WESTMORELAND, C. G.**
Chemicals enhanced oil recovery [DE82-003475] p 105 N83-14206
- WESTNEY, R. P.**
Textured solar cell covers for light weight and high performance p 66 N83-14728
- WESTPHAL, W.**
Current topics of SPS realization from a European viewpoint p 156 A83-11283
- WETZEL, P. E.**
Stevens Home, Rancho Santa Fe, California Solar-energy-system performance evaluation, Oct 1981 - Apr 1982 [DE82-021698] p 50 N83-12538
EROS Data Center, Sioux Falls, South Dakota Solar-energy-system performance evaluation, Oct 1981 - Apr 1982 [DE82-021703] p 50 N83-12540
- WETZER, J. M.**
Effect of radiation and non-Maxwellian electron distribution on relaxation processes in an atmospheric cesium seeded argon plasma [EUT-82-E-124] p 140 N83-15144
- WHELOCK, T. D.**
Physicochemical cleaning and recovery of coal p 87 N83-10577
- WHIPPLE, D. W.**
Resource targets for advanced underground coal extraction systems [NASA-CR-169429] p 85 N83-10503
- WHITAKER, C.**
Data report for the Southwest Residential Experiment Station, Mar 1982 [DE82-020400] p 52 N83-12556
- WHITE, A. L.**
Small-scale waste-to-energy systems A state-of-the-art report p 4 N83-10583
- WHITE, D. J.**
Combustion characteristics of hydrogen-carbon monoxide based gaseous fuels p 78 A83-11491
Combustion characteristics of hydrogen Carbon monoxide based gaseous fuels [NASA-TM-82998] p 76 N83-10560
- WHITE, M. A.**
Conceptual design and cost analysis of hydraulic output unit for 15 kW free-piston Stirling engine [NASA-CR-165543] p 121 N83-10561
- WHITE, R.**
Cryo-cooler development for space flight applications p 114 A83-13460
Metal chelate catalysts for fuel cells [PB82-195637] p 131 N83-12592
- WHITEHEAD, G. L.**
Performance results of a 300 MWth generator at high magnetic field [AIAA PAPER 83-0394] p 117 A83-16690
- WHITTEN, R. C.**
The satellite power system - Assessment of the environmental impact on middle atmosphere composition and on climate p 2 A83-14517
- WHYTE, R. B.**
Propulsion and energetics panel, working group 13 on alternative jet engine fuels Volume 1, Executive summary [AGARD-AR-181-VOL-1] p 92 N83-11350
Propulsion and energetics panel, working group 13 on alternative jet engine fuels Volume 2, Main report [AGARD-AR-181-VOL-2] p 92 N83-11351
- WIELAND, R. M.**
Neutral-beam deposition in large, finite-beta noncircular Tokamak plasmas [DE82-008146] p 127 N83-10957
- WIESNER, B.**
Study of the possibilities of more rational use of energy in the sector of trade and commerce, part 1 [BMFT-FB-T-82-076-PT-1] p 5 N83-10618
Study of the possibilities of more rational use of energy in the sector of trade and commerce, part 2 [BMFT-FB-T-82-077-PT-2] p 7 N83-11591
- WILBUR, D. M.**
Southern California offshore air quality model validation study Volume 1 Executive summary [PB82-190711] p 9 N83-11631
Southern California offshore air quality model validation study. Volume 2 Synthesis of findings [PB82-190729] p 9 N83-11632
- WILDIN, M. W.**
Performance of labyrinth-stratified water-storage system for heating and cooling [DE82-000107] p 168 N83-15946
- WILGEN, J. B.**
Second-cyclotron-harmonic emission measurements on ISX-B [DE82-009938] p 126 N83-10949
- WILHELM, H. E.**
Detonation driven induction generators with parallel and antiparallel external and induced magnetic fields p 118 A83-17371
- WILLIAMS, A. E.**
An integrated model for the natural flow regime in the Cerro Prieto hydrothermal system, B.C., Mexico, based upon petrological and isotope geochemical criteria [DE82-001880] p 107 N83-14658
- WILLIAMS, E. W.**
Electrophoretic Cds/Cu₂S solar cells for space applications p 63 N83-14704
- WILLIAMS, T. A.**
Evaluation of solar-air-heating central-receiver concepts [DE82-016924] p 48 N83-11586
- WILLIS, P. B.**
Investigation of test methods, material properties and processes for solar cell encapsulants [NASA-CR-169636] p 60 N83-14676
- WILLSON, W. G.**
Liquefaction behavior of an Australian brown coal in comparison to that of two US lignites [DE82-021977] p 95 N83-12201
- WILSON, D. R.**
Transient flow analysis of the AEDC/HPDE MHD generator [AIAA PAPER 83-0395] p 117 A83-16691
- WILSON, R. K.**
Contact stresses on a thin plate after large displacements to a full parabolic surface [DE82-005712] p 55 N83-13504
- WINARNO, H.**
Power conditioning in an autonomous system controlled by a microprocessor Simulation of use with a photovoltaic generator p 30 A83-13807
- WINCZEWSKI, L. M.**
Computer management of geologic and petroleum data at the North Dakota Geological Survey [DE82-904385] p 103 N83-13694
- WINDOW, B.**
Rapid simulated solar absorptance measurements on flat or curved surfaces p 32 A83-15476
- WINGENBACH, W.**
Recent tests on the Carter small reciprocating steam engines p 43 N83-10536
- WINSTON, R.**
A new evacuated CPC collector tube p 37 A83-18558
- WIPF, S. L.**
High-current pulses from inductive energy stores [DE82-004366] p 167 N83-15587
- WITTWER, V.**
Solar energy conversion based on the principle of fluorescent collectors [BMFT-FB-T-82-081] p 47 N83-10621
- WITZKE, H.**
Meaning of the photovoltaic band gap for amorphous semiconductors p 25 A83-12287
- WOLF, D. A.**
Heat pipe thermal switch [NASA-CASE-GSC-12812-1] p 159 N83-12525
- WOLF, M.**
Research possibilities? No! Needs for research to make PV solar energy utilization broadly competitive p 40 N83-10517
New silicon cell design concepts for 20 percent AMI efficiency p 68 N83-15808
- WONG, C. P. C.**
Prospects of low-activation fusion-reactor design [DE82-003198] p 155 N83-16231
- WOOD, C. F.**
Review of DAF Indal VAWT commercialization programs p 148 N83-15930
- WOOD, D.**
An economic evaluation of solar energy p 45 N83-10549
- WOOD, D. O.**
A review of the Energy Productivity Center's least cost energy strategy study [PB82-188111] p 11 N83-12591
- WOOD, J. T.**
Thermal infrared sensing applied to energy conservation in building envelopes /Thermosense IV/, Proceedings of the Meeting, Ottawa, Ontario, Canada, September 1-4, 1981 p 2 A83-12686
- WOODCOCK, G. R.**
Power requirements for manned space stations p 140 N83-15842
- WOODWARD, H. T.**
The satellite power system - Assessment of the environmental impact on middle atmosphere composition and on climate p 2 A83-14517
- WOODY, H. B.**
Test status and experience with the 7.5 megawatt MOD-2 wind turbine cluster p 147 N83-15918
- WOOLLAM, J. A.**
Diffusion length measurements in solar cells An analysis and comparison of techniques p 69 N83-15812
- WOOLSEY, G. B.**
Vitrification of high-level radioactive waste in a small-scale joule-heated ceramic melter [DE82-002227] p 21 N83-15113
- WORTHINGTON, P. J.**
A review of aero-generator fatigue problems p 119 A83-18939
- WRIGHTON, F.**
The development of a geopressed energy management information system in support of research planning, phase 1 [PB82-207366] p 91 N83-10638
- WRIGHTON, M. S.**
Fuel and electricity generation from illumination of inorganic interfaces [AD-A119305] p 67 N83-14741
- WU, C. D.**
Electromagnetic studies of redox systems for energy storage [NASA-CR-169593] p 165 N83-14667
- WU, F. C.**
CW-laser annealed solar cells p 23 A83-10638
- WU, Y. C. L.**
Three-dimensional current distribution in coal-fired MHD channels [DE82-016958] p 99 N83-13005
- WULFF, P.**
Running hot water A systems approach to energy conservation [FOA-C-10202-M2] p 5 N83-10628
- WYNHOLDS, H.**
Safety data for small wind systems [DE82-015400] p 131 N83-12565

X

- XIAOLUNG, X.**
Physics (selected articles) [AD-A119830] p 154 N83-16143
- XIE, K.**
The influence of the interface state on the properties of solar cell semiconductor electrodes p 26 A83-13473

Y

- YABLONOVITCH, E.**
Meaning of the photovoltaic band gap for amorphous semiconductors p 25 A83-12287
- YAGHOUBZADEH, N.**
Catalytic liquefaction of biomass [DE82-003329] p 108 N83-14752
- YAKUPKOVIC, J. E.**
Development of instrumental methods of analysis of sulfur compounds in coal-process streams [DE82-003291] p 20 N83-14776
- YAMANA, M.**
Metal chelate catalysts for fuel cells [PB82-195637] p 131 N83-12592

YAMAZAKI, K.

- Sufficient stability condition for alpha-driven velocity-space modes in compression Tokamak [IPPJ-609] p 131 N83-12996
- Comments on thermal runaway experiments in sub-ignition Tokamaks [IPPJ-610] p 131 N83-12997

YANG, L.

- Nuclear fuel systems for space power application p 144 N83-15871
- Thermionic conversion for space power application p 144 N83-15886

YATSUI, K.

- Proceedings of International Topical Meeting on ICF Research by Light-Ion Beam [IPPJ-611] p 138 N83-15126

YE, Z.

- Alcohol as a fuel for farm and construction equipment [DE82-021022] p 100 N83-13277

YEAGER, E.

- Electromagnetic studies of redox systems for energy storage [NASA-CR-169593] p 165 N83-14667

YEH, Y. C. M.

- Progress toward thin-film GaAs solar cells using a single-crystal Si substrate with a Ge interlayer p 69 N83-15817

YEN, J. T.

- Investigations of the tornado wind energy system [DE82-017122] p 121 N83-10601

YOCKE, M. A.

- Mathematical model for the analysis of wind-turbine wakes p 117 A83-16108
- Evaluation of short-term NO₂ plume models for point sources Volume 1 Technical discussion [PB82-234329] p 16 N83-13658

YOST, D. M.

- Installation of a diesel engine combustion/ignition evaluation facility [AD-A119610] p 104 N83-14189

YOUNG, J. K.

- Evaluation of solar-air-heating central-receiver concepts [DE82-016924] p 48 N83-11586

YOUNG, S. K.

- Integrated solar energy system optimization p 26 A83-13477

YUAN, K. Y.

- Conceptual design for a modular-stellarator fusion-reactor magnet [DE82-002863] p 138 N83-15135

Z**ZABIELSKI, M. F.**

- Reaction-induced temperature deviations during coal devolatilization in a heated grid [DE82-003864] p 106 N83-14300

ZACEK, F.

- Lower-hybrid heating experiment on the TM-1-MH Tokamak p 150 N83-16116
- Energy balance in TM-1-MH Tokamak (ohmic heating) p 151 N83-16122

ZAFRIR, M.

- Polycrystalline lanthanum rhodate and lutetium rhodate photoelectrodes for liquid junction solar cells p 33 A83-15480

ZAKHIDOV, R. A.

- Automatic methods for the adjustment of faceted solar-energy concentrators and heliostats p 31 A83-15131

ZALAY, A.

- The dynamic inducer as a cost-effective wind turbine system p 118 A83-18457

ZALAY, A. D.

- Optimization of the dynamic inducer wind turbine system p 150 N83-15940

ZANNETTI, P.

- Southern California offshore air quality model validation study Volume 1 Executive summary [PB82-190711] p 9 N83-11631
- Southern California offshore air quality model validation study Volume 2 Synthesis of findings [PB82-190729] p 9 N83-11632

ZASTROW, A.

- Solar energy conversion based on the principle of fluorescent collectors [BMFT-FB-T-82-081] p 47 N83-10621

ZAUDERER, B.

- Potential role and technology status of closed-cycle MHD for light-weight nuclear space-power systems p 142 N83-15853

ZAUGG, P.

- Preliminary design study of compressed-air energy storage in a salt dome Volume 4 CAES turbomachinery design [DE82-019781] p 162 N83-12561

ZEHR, S. W.

- Efficiency-improvement study for GaAs solar cells [DE82-016410] p 48 N83-11585

ZERLAUT, G. A.

- Spectroradiometer measurements in support of photovoltaic device testing p 32 A83-15458

ZESHENG, C.

- Physics (selected articles) [AD-A119830] p 154 N83-16143

ZEWEN, H.

- A point focusing collector for an integrated water/power complex p 44 N83-10541

ZHOU, P.-Z.

- The influence of the interface state on the properties of solar cell semiconductor electrodes p 26 A83-13473

ZIELINSKI, R. E.

- Physical and chemical characterization of devonian gas shale [DE82-002560] p 111 N83-15802

ZIJDEMANS, F.

- Further developments of the ECS solar array p 64 N83-14715

ZIMMERMAN, D. K.

- Thin film concentrator panel development p 42 N83-10529

ZIMMERMAN, M.

- Estimation of resource and reserves [PB82-230954] p 103 N83-13631

ZOBENS, A.

- Energy efficient face seal [NASA-CR-165591] p 21 N83-15659

ZOSCHAK, R. G.

- Assessment/review of methanol technology and utilization as a fuel [AD-A120109] p 109 N83-15489

ZWANZIGER, M. G.

- Operation of a steady-state pH-differential water electrolysis cell p 75 A83-16041

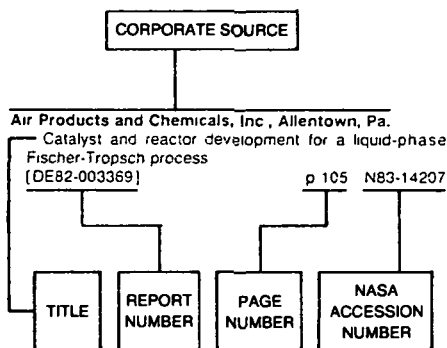
ZWERDLING, S.

- Progress toward thin-film GaAs solar cells using a single-crystal Si substrate with a Ge interlayer p 69 N83-15817

ZWILLENBERG, M. L.

- Sewage sludge as a supplementary utility boiler fuel p 88 N83-10590

Typical Corporate Source Index Listing



The title of the document is used to provide a brief description of the subject matter. The page number and NASA or AIAA accession number are included in each entry to assist the user in locating the abstract. If applicable, a report number is also included as an aid in identifying the document.

A

- Academy of Sciences, Berlin (East Germany).**
Numerical simulation of collective ion acceleration p 152 N83-16127
Crater formation by high current discharges in vacuum p 152 N83-16129
Dynamics of ionization and transport in a magnetically confined plasma column p 153 N83-16132
- Acres American, Inc., Buffalo, N.Y.**
Preliminary design study of underground pumped hydro and compressed-air energy storage in hard rock. Volume 8. Design approaches - UPH Appendix B Shafts [DE81-028202] p 164 N83-13607
- Acurex Corp., Morrisville, N.C.**
Pilot-scale assessment of conventional particulate control technology for pressurized fluidized-bed combustion emissions [PB82-230921] p 103 N83-13673
- Acurex Corp., Mountain View, Calif.**
Acurex Parabolic Dish Concentrator (PDC-2) p 42 N83-10527
Measurement of high-temperature high-pressure processes. A summary report [PB82-196932] p 98 N83-12667
Environmental assessment of stationary source NOx control technologies [PB82-249350] p 16 N83-13665
- Advanco Corp., El Segundo, Calif.**
Dish Stirling system integration and test progress report p 44 N83-10539
Commercialization of parabolic dish systems p 44 N83-10540
Panel discussions. Industrial support sector requirements p 4 N83-10550
- Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).**
Propulsion and energetics panel, working group 13 on alternative jet engine fuels. Volume 1. Executive summary [AGARD-AR-181-VOL-1] p 92 N83-11350

- Propulsion and energetics panel, working group 13 on alternative jet engine fuels. Volume 2. Main report [AGARD-AR-181-VOL-2] p 92 N83-11351
- Aeronautical Research Inst. of Sweden, Stockholm.**
Some innovative concepts in wind turbines of the axial-flow, cross-flow, and combined (dual) flow types p 149 N83-15935
- Aerospace Corp., El Segundo, Calif.**
PV large systems project p 40 N83-10512
- AeroChem Research Labs., Inc., Princeton, N. J.**
Soot formation in syngases [DE82-004271] p 94 N83-12199
- AeroVironment, Inc., Pasadena, Calif.**
Southern California offshore air quality model validation study. Volume 1. Executive summary [PB82-190711] p 9 N83-11631
Southern California offshore air quality model validation study. Volume 2. Synthesis of findings [PB82-190729] p 9 N83-11632
Optimization of the dynamic inducer wind turbine system p 150 N83-15940
- Agri-Answer, Inc., Union City, Ind.**
Total energy food plant 21 million gallon ethanol facility [DE82-019258] p 14 N83-13617
- Agricultural Research Service, Manhattan, Kans.**
Darreus wind-turbine and pump performance for low-lift irrigation pumping [DE82-016270] p 131 N83-12564
- Air Force Academy, Colo.**
Simplified solar fraction estimation for space and water heating at Department of Defense installations. Appendix C. Water heating nomographs [AD-A120014] p 73 N83-15904
Simplified solar fraction estimation for space and water heating at Department of Defense installations. Appendix B. Space heating nomographs [AD-A120013] p 73 N83-15905
Simplified solar fraction estimation for space and water heating at Department of Defense installations [AD-A120012] p 74 N83-15906
- Air Force Systems Command, Wright-Patterson AFB, Ohio.**
Inductive energy stores [AD-A118337] p 162 N83-11582
Physics (selected articles) [AD-A119830] p 154 N83-16143
- Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.**
Testing of an improved lithium-sulfur dioxide battery for aircrew life support equipment [AD-A119374] p 163 N83-13592
Air Force development of thin GaAs solar cells p 69 N83-15816
Cold crucible Czochralski for solar cells p 70 N83-15824
Progress in developing high performance solar blankets and arrays p 71 N83-15829
- Air Products and Chemicals, Inc., Allentown, Pa.**
Catalyst and reactor development for a liquid-phase Fischer-Tropsch process [DE82-003369] p 105 N83-14207
- AIResearch Mfg. Co., Los Angeles, Calif.**
Application of the subatmospheric engine to solar thermal power p 45 N83-10546
A high temperature ceramic heat exchanger element for a solar thermal receiver [NASA-CR-169625] p 58 N83-14666
- AIResearch Mfg. Co., Phoenix, Ariz.**
Advanced Gas Turbine (AGT) powertrain system development program [NASA-CR-169475] p 128 N83-12088
- AIResearch Mfg. Co., Torrance, Calif.**
High-temperature ceramic heat exchanger element for a solar thermal receiver p 26 N83-13476
A lightweight electronically commutated dc motor for electric passenger vehicles [NASA-CR-165601] p 119 N83-10348
High-temperature ceramic heat exchanger element for a solar thermal receiver p 44 N83-10543

- Alaska Univ., Fairbanks.**
Radar and infrared remote sensing of geothermal features at Pilgrimage Springs, Alaska p 79 N83-12036
- Allen (Eliot) and Associates, Inc., Salem, Oreg.**
Guide to a geothermal heat plan: A geothermal energy application, serial no. 3 [DE82-020591] p 13 N83-13598
- Aluminum Co. of America, Alcoa Center, Pa.**
Alcoa ALVAWT program p 148 N83-15928
- American Gas Association Labs., Cleveland, Ohio.**
Commercialization of a pulse combustion furnace with ultrahigh efficiency [PB82-243809] p 12 N83-13217
- Applied Concepts Corp., Reston, Va.**
Verification testing of the PKI collector at Sandia National Laboratories, Albuquerque, New Mexico p 43 N83-10534
PKI solar thermal plant evaluation at Capitol Concrete Products, Topeka, Kansas p 43 N83-10535
- Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.**
Geothermal energy development in the United States [PB82-215146] p 6 N83-10636
Ocean thermal energy at the Johns Hopkins University Applied Physics Laboratory [PB82-215054] p 122 N83-10639
Geothermal community heating for Cape Charles, Virginia [PB82-184003] p 91 N83-10640
Geothermal energy market study on the Atlantic Coastal Plain. Dover Air Force Base geothermal energy evaluation [PB82-183997] p 91 N83-10643
- Applied Solar Energy Corp., City of Industry, Calif.**
Large-area silicon sheet task p 41 N83-10520
Recent developments in thin silicon solar cells p 68 N83-15809
- Arbeitsgemeinschaft Ruckelshau K.G. (West Germany).**
Absorption type water chiller fired directly by waste heat [BMFT-FB-T-82-129] p 7 N83-11593
- Argonne National Lab., Ill.**
Proceedings of the US Department of Energy/Argonne National Laboratory Contractors' Research and Development Workshop. Converting Waste to Energy [DE82-014337] p 87 N83-10578
Demonstration Tokamak power plant study [DE82-016182] p 125 N83-10937
Wildcat. A catalyzed D-D Tokamak reactor [DE82-013712] p 125 N83-10938
Materials technology for coal-conversion processes [DE82-004036] p 96 N83-12253
State-of-the-art of acoustic instrumentation for coal-conversion plants [DE82-004037] p 96 N83-12254
Development of enhanced heat transfer/transport/storage slurries for thermal-system improvement [DE82-021236] p 158 N83-12387
Annual synopsis of Argonne's aqueous battery support research, fiscal year 1981 [DE82-021143] p 163 N83-12583
Vehicle characterization for the TAPCUT Project. Performance and cost [DE82-019772] p 13 N83-13465
Optimal sizing of heating systems that store and use thermal energy [DE82-003011] p 164 N83-13609
Liquid-metal MHD for space power systems p 141 N83-15850
Prime power for high-energy space systems. Certain research issues p 143 N83-15863
Field evaluation and assessment of thermal energy storage for residential space heating [DE82-000164] p 168 N83-15949
- Arizona State Univ., Tempe.**
Some material implications of space nuclear reactors (non-fuel materials) p 170 N83-15870
- Arkansas Univ., Fayetteville.**
Exploration for fractured petroleum reservoirs using radar/Landsat merge combinations p 77 N83-10031

B

Army Aviation Research and Development Command, Cleveland, Ohio.

Cold-air performance of compressor-drive turbine of Department of Energy upgraded automobile gas turbine engine 2 Stage performance
[NASA-TM-82818] p 127 N83-11063

Army Construction Engineering Research Lab., Champaign, Ill.

CAEDS Computer-aided engineering and architectural design system
[AD-A117972] p 170 N83-11794
Overview of passive solar design techniques
[AD-A119993] p 73 N83-15899

Ashland Petroleum Co., Ky.

Refining of military jet fuels from shale oil Part 1 Preliminary process design, economic and yield optimization, and computer modeling
[AD-A117511] p 83 N83-10210

Association Euratom-CEA, Fontenay-aux-Roses (France).

Study of the ionic distribution and of the energy deposition in a plasma of Tokamak heated by injection of fast neutrals
[EUR-CEA-FC-1094] p 155 N83-16226

Atomic Energy Research Establishment, Harwell (England).

An efficient fully implicit simulator
[CSS-126] p 109 N83-15322
Corrosion tests in the Marchwood geothermal borehole
[AERE-G-2225] p 112 N83-15959

Automation Industries, Inc., Silver Spring, Md.

Stevens Home, Rancho Santa Fe, California Solar-energy-system performance evaluation, Oct 1981 - Apr 1982
[DE82-021698] p 50 N83-12538

Kalin Home, Long Island, New York Solar-energy-system performance evaluation, Sep 1981-Mar 1982
[DE82-021701] p 50 N83-12539

EROS Data Center, Sioux Falls, South Dakota Solar-energy-system performance evaluation, Oct 1981 - Apr 1982
[DE82-021703] p 50 N83-12540

Williamson Home, Ipswich, Mass solar-energy-system performance evaluation, Nov 1981 - Apr 1982
[DE82-021300] p 53 N83-12574

Lo-Cal, Champaign, Illinois solar-energy-system performance evaluation, Jan 1982 - Apr 1982
[DE82-021299] p 53 N83-12575

Isakson Home, Anoka, Minnesota solar-energy-system performance evaluation, Aug 1981 - Mar 1982
[DE82-021297] p 54 N83-12576

Karasek Home, Blackstone, Massachusetts solar-energy-system performance evaluation, Nov 1981 - Mar 1982
[DE82-021302] p 54 N83-12577

Tellunde School, Tellunde, Colorado solar-energy-system performance evaluation, February 1982 - April 1982
[DE82-021301] p 54 N83-12585

Wood Road School, Ballston Spa, New York solar-energy-system performance evaluation, November 1981 - April 1982
[DE82-021301] p 54 N83-12586

Avco-Everett Research Lab., Mass.

Volatile production during preignition heating
[DE82-003061] p 109 N83-15402
Magnetohydrodynamic power supply systems for space applications
p 141 N83-15852

AEG-Telefunken, Frankfurt am Main (West Germany)

Crude gas/air fuel cells with a phosphoric acid matrix
[BMFT-FB-T-82-167] p 128 N83-11601

AEG-Telefunken, Heilbronn (West Germany)

A family of thin high efficiency silicon solar cells
p 62 N83-14703
Aspects of end of life design for solar cells
p 63 N83-14706

AEG-Telefunken, Wedel (West Germany)

Low Earth orbit blanket technologies for the power range of 15-60 kW
p 61 N83-14696
Module technique of 5 x 5 cm(2) solar cells
p 62 N83-14698

Analytical prediction of the dynamic in-orbit behavior of large flexible solar arrays
p 65 N83-14723
The design of the L-SAT solar array
p 66 N83-14730
Solar arrays for small scientific satellites
p 66 N83-14731

AMAF Industries, Columbia, Md.

System analysis, design, construction and commission of a photovoltaic power plant for supply of broadcasting equipment
[BMFT-FB-T-82-125] p 68 N83-14763

Solar MHD systems with two-phase flow with magnetic liquid metal
p 141 N83-15851

Barber-Nichols Engineering Co., Arvada, Colo.

Organic Rankine power conversion subsystem development for the small community solar thermal power system
p 43 N83-10533

Battelle Columbus Labs., Ohio.

Analytical techniques for aromatic components in aircraft fuels
[AD-A118838] p 96 N83-12252
Symposium on Pulse-Combustion Applications Volume 1 Proceedings
[PB82-240060] p 159 N83-13310

Symposium on Condensing Heat Exchangers Volume 2 Proceedings
[PB82-240078] p 159 N83-13311
Conversion of forest residues to a methane-rich gas in a high-throughput gasifier
[DE82-020289] p 102 N83-13601

Total energy food plant 21 million gallon ethanol facility
[DE82-019258] p 14 N83-13617
CaO interactions in the staged combustion of coal
[DE82-003273] p 105 N83-14205

Potential for use of peat blends with coal for electric power generation
[DE82-003634] p 110 N83-15497

Battelle Inst., Frankfurt am Main (West Germany).

Research and development on a MIS thin film solar cell made of amorphous silicon
[BMFT-FB-T-82-079] p 47 N83-10620

Battelle Pacific Northwest Lab., Sequim, Wash.

Coal fly ash disposal in the ocean An alternative worth considering
[DE82-003835] p 20 N83-14781

Battelle Pacific Northwest Labs., Richland, Wash.

Kinetics and catalysis of producing synthetic gases from biomass
[PB82-214347] p 82 N83-10156

Bechtel Corp., San Francisco, Calif.

Photovoltaic balance-of-system assessment
[DE82-006429] p 57 N83-13622

Bedford Inst. of Oceanography, Dartmouth (Nova Scotia).

Background levels and environmental cycling of petroleum hydrocarbons Multimedia monitoring requirements
p 11 N83-12630

Bendix Corp., Sylmar, Calif.

Description of the 3 MW SWT-3 wind turbine at San Geronimo Pass California
p 74 N83-15922

Bendix Field Engineering Corp., Grand Junction, Colo.

Hydrogeochemical and stream-sediment reconnaissance basic data for Ulica quadrangle, New York Uranium Resource Evaluation Project
[DE82-020429] p 102 N83-13552

Hydrogeochemical and stream-sediment reconnaissance basic data for Manon, Canton, Pittsburgh and Cleveland quadrangles, Ohio, West Virginia, Pennsylvania Uranium Resource Evaluation Project
[DE82-020430] p 102 N83-13553

Hydrogeochemical and stream-sediment reconnaissance basic data for Beaumont, Lake Charles and Baton Rouge quadrangles, Texas, Louisiana Uranium Resource Evaluation Project
[DE82-020438] p 102 N83-13554

Hydrogeochemical and stream-sediment reconnaissance basic data for Ogdensburg and Lake Champlain quadrangles, New York, Vermont Uranium Resource Evaluation Project
[DE82-020417] p 102 N83-13557

Hydrogeochemical and stream-sediment reconnaissance basic data for Jenkins Quadrangle, Kentucky, Virginia, West Virginia Uranium resource evaluation project
[DE82-020431] p 102 N83-13558

Hydrogeochemical and stream-sediment reconnaissance basic data for Sherman, Taxarkana, El Dorado, and Greenwood quadrangles, Oklahoma, Texas, Arkansas, Mississippi
[DE82-020436] p 102 N83-13559

Bergbau A.G. Lippe (West Germany).

Pneumatic stowing with lateral discharge in coal faces with thick seams
[BMFT-FB-T-82-074] p 90 N83-10617

Bergbau-Forschung G.m.b.H., Essen (West Germany).

Coal gasification of steam-soluted catalyst
[BMFT-FB-T-82-073] p 81 N83-10143
Steam gasification of coal, project prototype plant nuclear process heat Report at the end of the reference phase
[BMFT-FB-T-82-069] p 90 N83-10616

Laboratory research for desulfurizing and NO-reduction by addition of ammonia under the conditions of the Bergbau-Forschung flue gas desulfurizing process
[BMFT-FB-T-82-147] p 9 N83-11617

Bergwerk Nordstern (West Germany).

Pneumatic stowing with lateral discharge in coal faces with thick seams
[BMFT-FB-T-82-074] p 90 N83-10617

Bituminous Coal Research, Inc., Monroeville, Pa.

Petrographic evaluation of pyrite in the products from two-stage coal-pyrite flotation
[DE82-003593] p 105 N83-14208

Boeing Aerospace Co., Seattle, Wash.

Power requirements for manned space stations
p 140 N83-15842

Boeing Computer Services, Inc., Seattle, Wash.

Intermediate photovoltaic system application experiment operational performance report Volume 7 Beverly High School, Beverly, Mass
[DE82-015790] p 46 N83-10607

Intermediate photovoltaic system application experiment operational performance Volume 6 for Lovington Square Shopping Center, Lovington, NM
[DE82-015476] p 47 N83-10608

Intermediate photovoltaic system application experiment operational performance report Volume 10 Newman Power Station, El Paso, Tex
[DE82-015791] p 48 N83-11588

Intermediate photovoltaic system application experiment operational performance report Volume 10 Lovington Square Shopping Center, Lovington, N Mex (USA)
[DE82-015792] p 49 N83-11589

Intermediate photovoltaic system application experiment operational performance report for CDC Light Manufacturing Building, San Bernardino, California
[DE82-020883] p 56 N83-13599

Boeing Engineering and Construction Co., Seattle, Wash.

Thin film concentrator panel development
p 42 N83-10529
Conceptual design of the 7 megawatt MOD-5B wind turbine generator
p 147 N83-15920

Boeing Engineering and Construction Co., Tukwila, Wash.

Test status and experience with the 7.5 megawatt MOD-2 wind turbine cluster
p 147 N83-15918

Borg-Warner Corp., Los Angeles, Calif.

Solar-energy-system performance evaluation, Cathedral Square, Burlington, Vermont, July - December 1981
[DE82-016999] p 52 N83-12563

British Aerospace Dynamics Group, Bristol (England).

Soldered solar arrays
p 67 N83-14735
Progress and development status of the Space Telescope solar array
p 67 N83-14736

Future developments and applications for the Space Telescope solar array
p 67 N83-14737
Anti-static coat for solar arrays
p 67 N83-14738

British Library Lending Div., Boston Spa (England).

Experiments on the ADAM 1 plant for the optimisation of methanization process in the long distance nuclear energy transmission system test run performed in the spring of 1980
[BLL-T5869/BG/MRS14614/82] p 85 N83-10495

Population hazards resulting from the combustion of fossil fuels and the nuclear power industry
[BLL-RISLEY-TR-4173-(9091 9)] p 11 N83-12594

Broetje (August) G.m.b.H. und Co., Rastede (West Germany).

Diesel driven low capacity heat pump for heating and hot water production
[BMFT-FB-T-82-128] p 7 N83-11592

Brookhaven National Lab., Upton, N. Y.

Harnessing the Sun for development Actions for consideration by the international community at the UN Conference on New and Renewable Sources of Energy for promoting the use of renewable energy in developing countries
[DE82-020273] p 52 N83-12558

Flash hydrolysis of coal for conversion to liquid and gaseous fuels
[DE82-019435] p 100 N83-13197

Advanced alkaline electrolysis cell development Development of electrolysis operation cell separator for 1250C
[DE82-020697] p 76 N83-13593

A reference-material system for estimating health and environmental risks of selected material cycles and energy systems
[DE82-019309] p 15 N83-13647

Design and preparation of new, highly active Fischer-Tropsch catalysts
[DE82-003670] p 105 N83-14202

Hydrogen recovery from supplemented natural gas by metal hydrides
[DE82-002245] p 76 N83-14303
Compact, high-power nuclear reactor systems based on small diameter particulate fuel
p 143 N83-15859

Brown Boveri Corp., North Brunswick, N.J.

Preliminary design study of compressed-air energy storage in a salt dome Volume 4 CAES turbomachinery design
[DE82-019781] p 162 N83-12561

Brown, Boveri und Cie, A.G., Heidelberg (West Germany).

Development of the sodium/sulfur batteries, phase 2 [BMFT-FB-T-82-142] p 162 N83-11599

Bureau of Mines, Albany, Oreg.

Electrochemical determination of Gibbs energies of formation of cobalt and nickel sulfides
[PB82-177304] p 119 N83-10159

Bureau of Mines, Denver, Colo.

Evaluation of a sheathed permissible explosive charge for open shooting in flammable atmospheres Adobe charge program
[PB82-220732] p 103 N83-13636

Bureau of Mines, Pittsburgh, Pa.

Computerized, remote monitoring systems for underground coal mines Fires and explosive atmospheres
[PB82-221359] p 3 N83-10481

C**California Inst. of Tech., Pasadena.**

The luminescent solar concentrator
p 48 N83-10902
Measurements of magnetic field fluctuations in the Caltech research Tokamak p 124 N83-10925

California State Lands Commission, Sacramento.

Geothermal resource development for direct heat applications The impact of regulation
[PB82-208414] p 8 N83-11606

California Univ., Berkeley.

Assessment of high heat-transfer evaporators as power plant condensers to produce abundant freshwater
[PB82-198045] p 7 N83-11277

Investigation of free-forced convection flows in cavity-type receivers
[DE82-020118] p 49 N83-12386

Use of waste heat in district systems with considerations of seasonal-heat-demand variations
[DE82-019923] p 14 N83-13614

California Univ., Berkeley. Lawrence Berkeley Lab.

Accelerator and fusion research division
[DE82-012361] p 124 N83-10930

Technology-base research project for electrochemical storage report for 1981
[DE82-020599] p 163 N83-12573

Electrochemical storage cell based on polycrystalline silicon
[DE82-020595] p 56 N83-13600

Computerized instrumented residential audit, version 1.0 Source listings
[DE82-019953] p 14 N83-13613

Small-scale energy-technology projects in the Pacific Territories A case-study review
[DE82-001338] p 67 N83-14751

Catalytic liquefaction of biomass
[DE82-003329] p 108 N83-14752

Lawrence Berkeley Laboratory neutral-beam engineering test facility power-supply system
[DE82-003044] p 137 N83-15104

California Univ., Livermore. Lawrence Livermore Lab.

Stability and disturbance of large dc superconducting magnets
[DE82-012388] p 122 N83-10879

Composite-material flywheels and containment systems
[DE82-021120] p 132 N83-13001

Fluidized-bed pyrolysis of oil shale Oil yield, composition, and kinetics
[DE82-021010] p 97 N83-12571

Plasma parameter measurements using neutral-particle-beam attenuation
[DE82-021120] p 132 N83-13001

Synroc processing options
[DE82-004230] p 17 N83-13976

Feasibility study of a fission-suppressed tandem-mirror hybrid reactor
[DE82-019375] p 134 N83-13997

Energy and technology review
[DE82-019371] p 137 N83-14747

Assessment of some of the problems in the USA of superconducting magnets for fusion research
[DE82-003066] p 137 N83-15111

Heavy-ion inertial fusion Initial survey of target gain versus ion-beam parameters
[DE82-003069] p 138 N83-15117

Utilizing subcooled, superfluid He-II in the design of a 12-Tesla tandem-mirror experiment
[DE82-003322] p 138 N83-15133

Designs of tandem-mirror fusion reactors
[DE82-000845] p 138 N83-15134

Magnet and conductor developments for the mirror fusion program
[DE82-001062] p 139 N83-15136

Analytical and numerical calculations of field-reversed Theta-pinch equilibria based on a generalized Hill's vortex model
[DE82-003150] p 139 N83-15139

Reaction kinetics and diagnostics for oil-shale retorting
[DE82-001598] p 112 N83-15952

Ideas for implementing air-quality studies in the western Rocky Mountain region
[DE82-000063] p 22 N83-15960

The MFTF-B plasma diagnostic system
[DE82-002594] p 155 N83-16228

California Univ., Riverside.

An integrated model for the natural flow regime in the Cerro Prieto hydrothermal system, B.C., Mexico, based upon petrological and isotope geochemical criteria
[DE82-001980] p 107 N83-14658

Use of wireline logs at Cerro Prieto in identification of the distribution of hydrothermally altered zones and dike locations and their correlation with reservoir temperatures
[DE82-001981] p 107 N83-14661

Cambridge Systematics, Inc., Berkeley, Calif.

Residential End-use Energy Planning System (REEPS)
[DE82-906444] p 14 N83-13619

Carnegie-Mellon Univ., Pittsburgh, Pa.

Program of basic research on the utilization of coal-water mixture fuels
[DE82-002232] p 106 N83-14299

A survey of recent advances in and future prospects for thermionic energy conversion
[DE82-001980] p 145 N83-15888

Carrier Corp., Syracuse, N.Y.

Northern-climate heat-pump field performance evaluation
[DE82-905832] p 12 N83-13402

Case Western Reserve Univ., Cleveland, Ohio.

Planar multijunction high voltage solar cell chip
[DE82-001981] p 30 N83-13923

Electromagnetic studies of redox systems for energy storage
[NASA-CR-169593] p 165 N83-14667

Centec Consultants, Inc., Reston, Va.

Program guide to used oil recycling
[DOE/CS-40402/1] p 104 N83-14178

Center Four Engineering, Redmond, Oreg.

Basin view geothermal heating district, Klamath Falls, Oregon Conceptual design and economic-feasibility study report
[DE82-015108] p 93 N83-11587

Centre National de la Recherche Scientifique, Marseilles (France).

The French thermo-helio-electricity-KW parabolic dish program
[DE82-001981] p 44 N83-10542

Centre National de la Recherche Scientifique, Toulouse (France).

The reduction of radiation damage in space solar cells
[DE82-001981] p 63 N83-14710

Centro Informazioni Studi Esperienze, Milan (Italy).

Experimental results of a nonconventional energy conversion pilot facility-thermogravimetric system
[CISE-1754] p 103 N83-13629

The experience collected in the management of the Centro Informazioni Studi Esperienze (CISE) radioactive waste from 1960 to 1980
[CISE-1738] p 17 N83-13977

Regional energy planning Some suggestions to public administration
[CISE-1795] p 19 N83-14765

Ceskoslovenska Akademie Ved, Prague.

Eleventh Czechoslovak Seminar on Plasma Physics and Technology
[IPPCZ-244] p 150 N83-16114

Lower-hybrid heating experiment on the TM-1-MH Tokamak
[IPPCZ-244] p 150 N83-16116

Power spectrum optimization of the three-waveguide grill for the T-7 Tokamak
[IPPCZ-244] p 150 N83-16117

Short wavelength lower hybrid waves nonlinearly excited due to ponderomotive density modulation
[IPPCZ-244] p 151 N83-16118

ANDROMEDA The system for the acquisition and numerical data processing and its application for experimental device Tokamak TM-1-MH
[IPPCZ-244] p 151 N83-16120

Soft X-ray diagnostics on Tokamak TM-1-MH
[IPPCZ-244] p 151 N83-16121

Energy balance in TM-1-MH Tokamak (ohmic heating)
[IPPCZ-244] p 151 N83-16122

Computer simulations of reflex E-beam systems and plasma stability
[IPPCZ-244] p 151 N83-16123

Soft X-ray and VUV emission from REB-heated plasma in REBEX 1 and REBEX 1 machines
[IPPCZ-244] p 152 N83-16130

Dynamical model of an overheated magnetized plasma
[IPPCZ-244] p 152 N83-16131

Apparatus for plasma electron temperature and density measurements by Thomson scattering
[IPPCZ-244] p 153 N83-16134

Global model of a hybrid Tokamak reactor with an auxiliary RF heating
[IPPCZ-244] p 153 N83-16137

Simulation code of relativistic electron beam diodes
[IPPCZ-244] p 153 N83-16138

Numerical simulation of the interaction of an electromagnetic wave with an inhomogeneous plasma
[IPPCZ-244] p 154 N83-16140

Chalmers Univ. of Technology, Goteborg (Sweden).

Some methods to connect a windpower induction generator to the utility network
[DE82-750057] p 133 N83-13372

Chem Systems, Inc., New York

Technical and economic assessment of processes for the production of butanol and acetone
[NASA-CR-169623] p 106 N83-14293

Chemapeac, Inc., Woodbury, N.Y.

Total energy food plant 21 million gallon ethanol facility
[DE82-019258] p 14 N83-13617

Christopher Newport Coll., Newport News, Va.

Layered transition metal thiophosphates /MPX3/ as photoelectrodes in photoelectrochemical cells
[DE82-019258] p 33 N83-15483

City Univ. of New York, N.Y.

The heat capacity of coal chars
[DE82-019258] p 83 N83-10206

Clark Dietz Engineers, Inc., Richmond, Ind.

Total energy food plant 21 million gallon ethanol facility
[DE82-019258] p 14 N83-13617

Clemson Univ., S.C.

Investigation of reliability attributes and accelerated stress factors on terrestrial solar cells
[NASA-CR-169620] p 59 N83-14670

College of Mechanical and Electrical Engineering, Pizen (Czechoslovakia).

Diagnostics of nonequilibrium hydrogen plasma
[DE82-019258] p 153 N83-16135

Cologne Univ. (West Germany)

Determination of the radiation budget at the Earth's surface from satellite data
[DE82-019258] p 68 N83-14808

Colorado Div. of Highways, Denver.

Data collection and analysis for geothermal research
[PB82-185430] p 97 N83-12390

Colorado School of Mines, Golden.

Liquid-vapor equilibrium for ternary natural gas system
[PB82-227679] p 82 N83-10160

Colorado State Univ., Fort Collins.

The behavior of LNG vapor clouds Wind-tunnel simulation of 40 M3 LNG spill tests at China Lake Naval Weapons Center, California
[PB82-199027] p 12 N83-12665

LNG plume interaction with surface obstacles
[PB82-198995] p 12 N83-12666

Columbia Univ., New York.

Membrane controlled anaerobic digestion
[DE82-019373] p 85 N83-10497

Production and experimental study of the dissipative trapped ion instability
[DE82-019373] p 123 N83-10910

Observations of plasma rotation in the high-beta Tokamak Torus 2
[DE82-019373] p 127 N83-10952

Combustion Power Co., Inc., Menlo Park, Calif.

Development of a solid waste fired fluidized boiler, phase 1
[DE82-019373] p 88 N83-10592

Commissariat a l'Energie Atomique, Paris (France).

Nuclear fuel cycle and waste management in France
[DE81-700732] p 104 N83-13975

Commission of the European Communities, Brussels (Belgium).

Risks, regulation responsibilities and costs in nuclear waste management A preliminary survey in the European Community
[EUR-6893] p 21 N83-15115

Committee on Governmental Affairs (U. S. Senate).

Energy conservation strategy for the 1980's
[GPO-86-217] p 10 N83-12521

Committee on Merchant Marine and Fisheries (U. S. House).

Acid rain CZMA
[GPO-91-371] p 8 N83-11611

Communications Satellite Corp., Clarksburg, Md.

Basis for equivalent fluence concept in space solar cells
[GPO-91-371] p 71 N83-15827

Silicon research and technology
[GPO-91-371] p 72 N83-15835

Comptroller General of the United States, Washington, D.C.

Aircraft thrust/power management can save defense fuel, reduce engine maintenance costs, and improve readiness
[GAO/PLRD-82-74] p 18 N83-14074

- Computer Sciences Corp., Hampton, Va.**
NECAP 4.1 NASA's Energy Cost Analysis Program thermal response factor routine [NASA-CR-165982] p 4 N83-10562
- Cook Inlet Region, Inc., San Francisco, Calif.**
Coal to methanol feasibility study Beluga methanol project Volume 4 Environmental [DE82-006057] p 10 N83-12542
- Cornell Univ., Ithaca, N. Y.**
Studies related to the deep earth gas [PB82-227653] p 84 N83-10213
Large-area silicon sheet task p 41 N83-10520
Magnetoelastic instabilities and vibrations of superconducting-magnet systems [DE82-015206] p 123 N83-10880
Computer simulation and molecular theory studies of natural gas mixtures [PB82-22060] p 92 N83-11349
- Council for Scientific and Industrial Research, Pretoria (South Africa)**
Energy policy formulation in South Africa APL as a tool to identify options p 20 N83-14968
- County of Delaware, Media, Pa.**
Demonstration of synergistic industrial energy/municipal solid waste disposal facility [DE82-001145] p 99 N83-13041
- County of Orange, Santa Ana, Calif.**
Acceptance-test report for El Toro Library solar heating and cooling demonstration project (SHAC no 1501) [DE82-019859] p 57 N83-13616
- Crane Packing Co., Morton Grove, Ill.**
Energy efficient face seal [NASA-CR-165591] p 21 N83-15659
- Curtiss-Wright Corp., Wood-Ridge, N.J.**
High-Temperature-Turbine-Technology Program Phase 2 Technology test and support studies Turbine spool technology rig fuel-contaminant tolerance test [DE82-020287] p 101 N83-13464
- CSI Resource Systems, Inc., Boston, Mass.**
Energy resource recovery facility for Kent and Sussex counties, Delaware [DE82-002539] p 19 N83-14753

D

- Davis Energy Group, Calif.**
Feasibility study of geothermal heating, Modoc Lassen housing project [DE82-015099] p 89 N83-10611
- Dayton Univ., Ohio.**
An update of the electrofluid dynamics wind driven generators p 149 N83-15936
- Delaware State Solid Waste Authority, Dover.**
Energy resource recovery facility for Kent and Sussex counties, Delaware [DE82-002539] p 19 N83-14753
- Departement d'Etudes et de Recherches en Technologie Spatiale, Toulouse (France)**
Analytic tools for the electrical design of solar generators p 66 N83-14727
- Department of Agriculture, College Station, Calif.**
The USDA agricultural wind energy research program p 147 N83-15914
- Department of Agriculture, Washington, D.C.**
Estimated capacity of US ethanol plants [PB82-203647] p 82 N83-10154
- Department of Energy, Bartlesville, Okla.**
Automated probe microdistillation/mass spectrometry for the analysis of high-molecular weight compounds in fossil fuels [PB82-022039] p 95 N83-12202
Contracts for field projects and supporting research on enhanced oil recovery and improved drilling technology [DE82-002598] p 111 N83-15803
- Department of Energy, Grand Forks, N. Dak.**
Liquefaction behavior of an Australian brown coal in comparison to that of two US lignites [DE82-021977] p 95 N83-12201
- Department of Energy, Portland, Oreg.**
Solar home show Homes designed for the solar homebuilders program [DE82-020255] p 52 N83-12557
- Department of Energy, Washington, D. C.**
National photovoltaic program p 3 N83-10506
Technology spin-offs from the magnetic fusion energy program [DE82-016923] p 123 N83-10897
Summary outline of DOE geoscience and geoscience related research [DE82-008203] p 97 N83-12480
Secretary's report to Congress Secretary's statement, program review and outlook [DE82-021878] p 10 N83-12581

- Summary of DOE Hydrogen Program FY-1981 by the Hydrogen Energy Coordinating Committee [DE82-020494] p 76 N83-13276
Special-purpose materials for magnetically confined fusion reactors [DE82-005310] p 134 N83-13974
Prospects for foreign applications of wind-energy systems, preliminary report in response to Public Law 96-345 [DE82-007930] p 19 N83-14745
The federal wind energy program p 146 N83-15909
- Detroit Diesel Allison, Indianapolis, Ind.**
Advanced Gas Turbine (AGT) powertrain system development for automotive applications [NASA-CR-165178] p 129 N83-12431
- Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany).**
The modal split in the Japanese passenger transportation system [DFVLR-FB-82-09] p 9 N83-11887
Retrospect of solar cell development in West Germany p 64 N83-14712
- Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany).**
Preliminary results of Helios solar generator inflight performance evaluation p 64 N83-14716
- Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).**
Development of a 5.5 m diameter vertical axis wind turbine, phase 3 [BMFT-FB-T-82-086] p 122 N83-10624
- Dortmunder Stadtwerke A.G. (West Germany).**
Utilization of the waste heat of a steel work [BMFT-FB-T-82-135] p 8 N83-11597
- Du Pont de Nemours (E. I.) and Co., Aiken, S.C.**
Parametric study of geohydrologic performance characteristics for nuclear-waste repositories [DE82-003145] p 17 N83-13973
Vitrification of high-level radioactive waste in a small-scale joule-heated ceramic melter [DE82-002227] p 21 N83-15113
- DAF Indal Ltd., Mississauga (Ontario).**
Review of DAF Indal VAWT commercialization programs p 148 N83-15930

E

- E-Systems, Inc., Dallas, Tex.**
A transmittance-optimized, point-focus Fresnel lens solar concentrator p 42 N83-10530
- Eagle-Picher Industries, Inc., Joplin, Mo.**
Chemical sources Battery p 140 N83-15844
- Ebon Research Systems, Washington, D.C.**
Emerging technologies for the control of hazardous wastes [PB82-236993] p 17 N83-13666
- Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.**
Methods to enhance blanket power density [DE82-017467] p 127 N83-10958
- Electric Power Research Inst., Palo Alto, Calif.**
Electric-utility solar-energy activities 1981 survey [DE82-905804] p 57 N83-13623
- Electromagnetic Systems Labs., Inc., Sunnyvale, Calif.**
Remote sensing applications to the development of an integrated data base for oil and gas exploration p 107 N83-14628
- Electrotechnical Lab., Ibaraki (Japan).**
Mass balance on the arc mode seed electrodes p 154 N83-16211
- Eltra Corp., Plymouth Meeting, Pa.**
Research, development, and demonstration of advanced lead-acid batteries for utility load leveling [DE82-019796] p 162 N83-11584
- Energy and Environmental Analysis, Inc., Arlington, Va.**
Assessment of current and projected future trends in light-duty-vehicle fuel switching Subtask 1 [DE82-018816] p 97 N83-12440
Industrial energy use, annual report for 1979 - 1980 [PB82-200585] p 11 N83-12590
Industrial energy use, volume 2 [PB82-200593] p 11 N83-12593
- Energy and Environmental Research Corp., Santa Ana, Calif.**
Development of criteria for extension of applicability of low-emission, high-efficiency coal burners [PB82-197153] p 93 N83-11377
- Energy Research Corp., Danbury, Conn.**
Internal reforming for natural gas fueled molten carbonate fuel cells [PB82-200676] p 128 N83-11607
Development of a high-rate insoluble zinc electrode for alkaline batteries [DE82-020608] p 162 N83-12572
- Energy Utilization Systems, Inc., Pittsburgh, Pa.**
The 1980 survey and evaluation of utility conservation, load management, and solar end-use projects Volume 3 Utility load management project [DE82-007247] p 10 N83-12559
Survey of utility load management projects Third revised report [DE82-000888] p 169 N83-15957
- Engelhard Industries, Inc., Edison, N.J.**
Develop and test fuel cell powered on-site integrated total energy system [NASA-CR-168020] p 140 N83-15839
- Engineering Development Establishment, Maribyrnong (Australia).**
Investigation of the performance of a Ford 4.1 L 6 cylinder SI engine operating on methanol iso-butanol gasoline fuel blends [AD-A117746] p 84 N83-10426
- Engineering-Science, Inc., Arcadia, Calif.**
Research, development and demonstration in the design of sanitary landfill to optimize the generation and capture of compressible gas p 89 N83-10595
- Entropy Environmentalists, Inc., Research Triangle Park, N.C.**
Boiler efficiency and emissions testing using Refuse-Derived Fuel (RDF) and coal [AD-A119291] p 19 N83-14772
- Enviro Control, Inc., Rockville, Md.**
Proceedings of the conference on energy conservation Retrofit of Municipal Wastewater Treatment Facilities [DE82-013710] p 5 N83-10612
- Environmental Protection Agency, Ann Arbor, Mich.**
Determination of a range of concern for mobile source emissions of hydrogen sulfide [PB82-201773] p 6 N83-10663
- Environmental Protection Agency, Research Triangle Park, N.C.**
Compilation of air pollutant emission factors, supplement 12 [PB82-184722] p 6 N83-10654
- Escher Technology Associates, St. Johns, Mich.**
Air circuit with heat pump [PB82-221219] p 18 N83-14312
- Eschweiler Bergwerks-Verein A.G., Herzogenrath-Kohlscheid (West Germany)**
Utilization of ANCIT plant by-products [BMFT-FB-T-82-144] p 94 N83-11600
- European Space Agency, Noordwijk (Netherlands).**
Space Telescope Solar panel assembly thermal test analysis p 65 N83-14724
- European Space Agency, Paris (France).**
Photovoltaic Generators in Space [ESA-SP-173] p 61 N83-14694
Announcement of an opportunity for space calibration of solar cells p 65 N83-14719
- European Space Research and Technology Center, Noordwijk (Netherlands)**
Primary calibration of high efficiency solar cells A comparison of 1980 data from CNES, Nasa (Lewis), JPL and RAE p 64 N83-14717
Large infrared test rig for vacuum temperature cycling tests in the ESTEC DTC p 65 N83-14720
Outlook for space energy systems at the end of the three-year assessment p 18 N83-14734
- EG and G Washington Analytical Services Center, Inc., Pocomoke City, Md.**
Experimental feasibility of the airborne measurement of absolute oil fluorescence spectral conversion efficiency p 169 N83-18581
- EIC, Inc., Newton, Mass.**
Ambient temperature rechargeable lithium battery [AD-A119297] p 166 N83-14742
- ETSI Telecomunicacion, Barcelona (Spain).**
Nonlinear algorithms application to irradiated solar cell parameters evaluation p 62 N83-14700

F

- Fachhochschule, Giessen (West Germany)**
Measurement studies of a 15 kW wind power plant [BMFT-FB-T-82-109] p 122 N83-10633
- Federal Aviation Administration, Washington, D.C.**
The impact of petroleum, synthetic and cryogenic fuels on civil aviation [FAA-EM-82-29] p 106 N83-14291
- Federal Coordinating Council for Science, Engineering and Technology, Washington, D. C.**
National Marine Pollution Program Plan Federal plan for ocean pollution research, development and monitoring Fiscal years, 1981 - 1985 [PB82-218462] p 6 N83-10656

Fenix and Scisson, Inc., Tulsa, Okla.

Preliminary design study of compressed-air energy storage in a salt dome Volume 4 CAES turbomachinery design [DE82-019781] p 162 N83-12561

Florida Univ., Gainesville.

Methods for investigating the properties of polycrystalline silicon p-n junction solar cells p 46 N83-10565
Defects and annealing studies in 1-Me electron irradiated (AlGa)As-GaAs solar cells p 70 N83-15822
Grown-in defects and defects produced by 1-Me electron irradiated in AlO₃Ga_{0.7}As P-N junction solar cells p 71 N83-15828

Flow Research, Inc., Kent, Wash.

Conceptual design and cost analysis of hydraulic output unit for 15 kW free-piston Stirling engine [NASA-CR-165543] p 121 N83-10561

Ford Aerospace and Communications Corp., Newport Beach, Calif.

Development status of the small community solar power system p 43 N83-10532

Ford Aerospace and Communications Corp., Palo Alto, Calif.

Feasibility study of solid surface subreflector production techniques [NASA-CR-169642] p 60 N83-14678

Forschungsstelle fuer Energiewirtschaft, Munich (West Germany).

Study of the possibilities of more rational use of energy in the sector of trade and commerce, part 1 [BMFT-FB-T-82-076-PT-1] p 5 N83-10618

Study of the possibilities of more rational use of energy in the sector of trade and commerce, part 2 [BMFT-FB-T-82-077-PT-2] p 7 N83-11591

Foster-Miller Associates, Inc., Waltham, Mass.

Evaluation of the Klosswall longwall mining system [DE82-015881] p 89 N83-10606

Fraser (J. Kenneth) and Associates, Rensselaer, N.Y.

Modular small hydro configuration [PB82-184953] p 129 N83-12327

Fraunhofer-Inst. fuer Bauphysik, Holtzkirchen (West Germany).

Economical optimized thermal insulation in buildings [BMFT-FB-T-82-131] p 8 N83-11594

Fraunhofer-Inst. fuer Angewandte Festkoerperphysik, Freiburg (West Germany).

Solar energy conversion based on the principle of fluorescent collectors [BMFT-FB-T-82-081] p 47 N83-10621

Friedrichs (Theodor) und Co., Schenefeld (West Germany).

Simple anemometer for wind classification [BMFT-FB-T-82-106] p 92 N83-10719

Friedrichsfeld G.m.b.H., Mannheim (West Germany).

Production technology of an electrolyte for Na/S batteries [BMFT-FB-T-82-065] p 161 N83-10614

G**Gamze-Korobkin-Caloger, Inc., Chicago, Ill.**

The 40kW fuel cell field test support [PB82-231630] p 133 N83-13633

Garrett Turbine Engine Co., Phoenix, Ariz.

Garrett solar Brayton engine/generator status p 44 N83-10545

Advanced Gas Turbine (AGT) powertrain system development for automotive applications [NASA-CR-165329] p 132 N83-13038

Gas Research Inst., Chicago, Ill.

Symposia on Pulse-Combustion Applications and Condensing Heat Exchangers [PB82-184086] p 91 N83-10641

General Accounting Office, Washington, D C

Developing Alaska's energy resources Actions needed to stimulate research and improve wetlands permit processing [GAO/EMD-82-44] p 18 N83-14664

Cleaning up the environment Progress achieved but major unresolved issues remain [GAO/CE-82-72] p 19 N83-14767

Nuclear and coal waste disposal hampered by legal, regulatory and technical uncertainties [EMD-82-63] p 19 N83-14770

General Atomic Co., San Diego, Calif.

The Doublet III Thomson-scattering-system hemiconcentric inlet lens [DE82-017384] p 123 N83-10908

Nuclear fuel systems for space power application p 144 N83-15871

Thermionic conversion for space power application p 144 N83-15886

Prospects of low-activation fusion-reactor design [DE82-003198] p 155 N83-16231

General Dynamics/Convair, San Diego, Calif.

Utilizing subcooled, superfluid He-II in the design of a 12-Tesla tandem-mirror experiment [DE82-003322] p 138 N83-15133

General Dynamics/Fort Worth, Tex.

Transient flow analysis of the AEDC/HPDE MHD generator [AIAA PAPER 83-0395] p 117 A83-16691

General Electric Co., Evendale, Ohio.

Energy efficient engine Flight propulsion system preliminary analysis and design [NASA-CR-159859] p 9 N83-12094

General Electric Co., Philadelphia, Pa.

Design and development of a high-concentration photovoltaic concentrator [DE82-015673] p 46 N83-10597

Analysis of small commercial photovoltaic applications [DE82-020924] p 51 N83-12548

Conceptual design of the 6 MW MOD-5A wind turbine generator p 147 N83-15919

General Electric Co., Schenectady, N. Y.

Improved transistorized AC motor controller for battery powered urban electric passenger vehicles [NASA-CR-167978] p 120 N83-10349

Development of high temperature turbine subsystem technology to a technology readiness status, phase 2 [DE82-003222] p 129 N83-12437

Evaluation of catalytic combustion of actual coal-derived gas [NASA-CR-167842] p 102 N83-13588

Geo-Centers, Inc., Newton, Mass.

Evaluation of plasma jet ignition for improved performance of alternate fuels [AD-A120160] p 112 N83-16212

Geological Survey, Washington, D. C.

Geological studies of the COST numbers G-1 and G-2 wells, United States north Atlantic outer continental shelf [USGS-CIRC-861] p 94 N83-11638

The geothermal research program of the US Geological survey [USGS-CIRC-862] p 112 N83-15965

Georgia Inst. of Tech., Atlanta.

Review of plasma-impurity sources during Tokamak operation [DE82-017098] p 126 N83-10951

Geothermal Development Associates, Reno, Nev.

Preliminary plan for the development of geothermal energy in the town of Hawthorne, Nevada [DE82-904440] p 14 N83-13620

Preliminary plan for the development of geothermal energy in the town of Gabbs, Nevada [DE82-904441] p 15 N83-13621

Geothermal Power Corp., Novato, Calif.

Geothermal reservoir assessment, Roosevelt Hot Springs [DE82-020632] p 97 N83-12541

Gesamthochschule, Kassel (West Germany).

Electron conductivity of the active masses of lead acid batteries during discharge and permanent service [BMFT-FB-T-82-078] p 161 N83-10619

Gilbert/Commonwealth, Reading, Pa.

Energy recovery and cogeneration from an existing municipal incinerator p 5 N83-10589

Global Geochemistry Corp., Canoga Park, Calif.

Geochemical studies of cores from the San Juan Basin Research Site, Grants Uranium Region, New Mexico [DE82-004153] p 108 N83-14795

Gould, Inc., Rolling Meadows, Ill.

Development of zinc bromide batteries for stationary energy storage [DE82-019283] p 164 N83-13612

Studies leading to the development of high-rate lithium-sulfuryl chloride battery technology [AD-A120853] p 146 N83-15901

Improved SCR ac motor controller for battery powered urban electric vehicles [NASA-CR-167919] p 169 N83-16257

Great Plains Gasification Association, Detroit, Mich.

Great Plains Gasification Project [DE82-019500] p 103 N83-13605

Greater Egypt Regional Planning and Development Commission, Carbondale, Ill.

Impact of alternate energy sources in the Greater Egypt region. Franklin, Jackson, Jefferson, Perry and Williamson Counties, Illinois [PB82-181090] p 6 N83-10642

Grosskraftwerk A.G., Mannheim (West Germany).

Improvement of electrostatic precipitators performance through conditioning by flue gas [BMFT-FB-T-82-123] p 20 N83-14783

Grumman Aerospace Corp., Bethpage, N.Y.

Investigations of the tornado wind energy system [DE82-017122] p 121 N83-10601

Thermal management of large pulsed power systems p 145 N83-15889

Economics of DAWT wind energy systems

p 150 N83-15939

Gulf South Research Inst., New Orleans, La.

Components identified in energy-related wastes and effluents [PB82-236985] p 101 N83-13283

H**Hamilton Standard, Windsor Locks, Conn.**

Status of the 4 MW WTS-4 wind turbine p 148 N83-15921

Harry Diamond Labs., Adelphi, Md.

Thermal battery systems for ordnance fuzing [AD-A119155] p 163 N83-13590

Hawaii State Dept. of Planning and Economic Development, Honolulu.

Geothermal power development in Hawaii Volume 1 Review and analysis [DE82-020077] p 10 N83-12544

Hemlock Semiconductor Corp., Mich.

Flat-plate collector research area Silicon material task p 41 N83-10519

Development of a polysilicon process based on chemical vapor deposition, phase 1 [NASA-CR-169633] p 59 N83-14673

Hittman Associates, Inc., Columbia, Md.

Evaluation of estimated energy conservation measure costs and benefits in the residential multifamily sector [DE82-000490] p 14 N83-13606

Honeywell Power Sources Center, Horsham, Pa

High efficiency lithium-thionyl chloride cell [AD-A118696] p 131 N83-12537

Lithium-sulfur dioxide (Li/SO₂) battery safety hazards Thermal studies [AD-A119381] p 163 N83-13591

Houston Univ., Tex.

Refractory residues, condensates and chondrules from solar furnace experiments p 31 N83-15371

Water demand for generating electricity A mathematical programming approach with application in Poland [IIASA-RR-82-16] p 158 N83-10498

Huanan Mining Coll (China).

Study of the freezing pressure acting on a shaft lining p 110 N83-15732

Hughes Aircraft Co., Torrance, Calif

Radiant heating tests of several liquid metal heat-pipe sandwich panels [AIAA PAPER 83-0319] p 157 A83-16649

Fabrication and development of several heat pipe honeycomb sandwich panel concepts [NASA-CR-165962] p 170 N83-10379

Hughes Research Labs., Malibu, Calif.

Advances in series resonant inverter technology and its effect on spacecraft employing electric propulsion [AIAA PAPER 82-1881] p 114 A83-12466

GaAs solar cells for concentrator systems in space p 70 N83-15820

I**Idaho Univ., Moscow.**

Gasification kinetics for biomass decomposition [PB82-199043] p 97 N83-12256

Illinois Inst. of Tech., Chicago.

Horizontal and vertical axis wind turbines p 130 N83-12529

Illinois Univ., Chicago.

Large-area silicon sheet task p 41 N83-10520

Illinois Univ., Urbana.

An experimental investigation of convective losses from solar receivers [UIU-ENG-81-4003] p 39 N83-10500

Advanced fuel concepts and applications [DE82-002710] p 137 N83-15110

Status, research requirements and potential applications for nuclear pumped lasers p 143 N83-15862

Imhausen-Chemie G.m.b.H., Lahr (West Germany).

The joint Australia/Federal Republic of Germany feasibility study on the conversion of Australian coals into liquid fuels in Australia [BMFT-FB-T-82-133] p 94 N83-11595

Informatics, Inc., Palo Alto, Calif.

The satellite power system - Assessment of the environmental impact on middle atmosphere composition and on climate p 2 A83-14517

Institut fuer Kemtechnik und Energiewandlung e.V., Stuttgart (West Germany).

Investigation of heat storage for temperature range from 200 to 500 C [BMFT-FB-T-82-105] p 161 N83-10627

Institute of Physics and Technology of Radiation Devices, Bucharest (Rumania).

A time resolving method for determining the energy spectrum of neutrons emitted by a plasma focus device
p 153 N83-16133

Institut fuer Erdoelforschung, Hanover (West Germany).

Critical relationships for displacement processes in oil fields
[BMFT-FB-T-82-093] p 84 N83-10479

Institut National de la Recherche Agronomique, Avignon (France).

Study of ground winds in Upper Volta Economic and agronomic consequences for the Sudan-Sahel region of west Africa
p 98 N83-12751

Institut Royal Meteorologique de Belgique, Brussels.

Wind power potential in Belgium
[PUBL-SER-B-115] p 86 N83-10563

Institute of Gas Technology, Chicago, Ill.

Advanced high-temperature thermal energy storage media for industrial applications
[DE82-000161] p 168 N83-15945

Institute of Nuclear Research, Swierk (Poland).

Fusion at counterstreaming ion beams Ions Optic Fusion (IOF)
p 151 N83-16124

Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

Analytical mode for interim expansion of electrical energy generating systems
[INPE-2558-TDL/104] p 129 N83-12520

Automatic interpretation of MSS-LANDSAT data applied to coal refuse site studies in southern Santa Catarina State, Brazil
[E83-10066] p 18 N83-14575

International Atomic Energy Agency, Vienna (Austria)

Packaging of radioactive wastes for sea disposal
[IAEA-TECDOC-240] p 21 N83-15114

International Inst. for Applied Systems Analysis, Laxenburg (Austria).

Energy for agriculture in Pakistan
[IIASA-RR-82-20] p 3 N83-10499

Iowa State Univ. of Science and Technology, Ames.

Fossil-energy
[DE82-018269] p 86 N83-10570
Rapid analysis of mineral content of coal Development of an on-line monitoring instrument for pyrite and ash in coal
p 86 N83-10571
Ashing properties of coal blends
p 86 N83-10572
Coal preparation and testing
p 86 N83-10573
Performance characteristics of heavy media cyclones using fly ash-derived heavy media
p 86 N83-10574
A systematic investigation of the organosulfur components in coal
p 86 N83-10575
Microstructure of coal
p 87 N83-10576
Physicochemical cleaning and recovery of coal
p 87 N83-10577

Ishikawajima-Harima Heavy Industries Co. Ltd., Yokohama (Japan)

Welding of AL-MG alloy 5083-0 for the construction of LNG storage tanks
p 93 N83-11500

IIT Research Inst., Chicago, Ill

Site characteristics for wind energy conversion devices
p 130 N83-12528

IMA Resources, Washington, D.C.

Design and feasibility study for a portable oil recovery turbopump
[NASA-CR-170704] p 110 N83-15628

J**Jet Propulsion Lab., California Inst. of Tech., Pasadena.**

Exploration for fractured petroleum reservoirs using radar/Landsat merge combinations
p 77 A83-10031
Remote sensing and uranium exploration at Lisbon Valley, Utah
p 77 A83-10032
Catalytic autothermal reforming increases fuel cell flexibility
p 74 A83-11794
Polymers metallic electrodes for rechargeable battery applications
p 160 A83-11813
Thermal response of solar receiver aperture plates during sun walk-off
[ASME PAPER 82-HT-33] p 25 A83-12791
Calibration of solar cells by the reference cell method - The spectral mismatch problem
p 28 A83-13580
Polycrystalline silicon availability for photovoltaic and semiconductor industries
p 28 A83-13648
Optical absorption coefficient and minority carrier diffusion length measurements in low-cost silicon solar cell material
p 30 A83-13922
Experience with specifications applicable to certification
p 32 A83-15463
Thermal reactor
[NASA-CASE-NPO-14369-1] p 75 N83-10501

Resource targets for advanced underground coal extraction systems

[NASA-CR-169429] p 85 N83-10503
Correlation of design with performance of primary lithium-sulfur oxyhalide cells
[NASA-CR-169369] p 120 N83-10504
Flat Plate Solar Array Project Proceedings of the 20th Project Integration Meeting
[NASA-CR-169370] p 39 N83-10505
FSAs future role
p 39 N83-10507
Union Carbide Corp polysilicon status and plans
p 40 N83-10508
Block 5 module design summary
p 40 N83-10510
Sacramento Municipal Utility District 100-MW sub e photovoltaic plant
p 40 N83-10513
Flat-plate collector research area Silicon material task
p 41 N83-10519
Large-area silicon sheet task
p 41 N83-10520
Environmental isolation task
p 41 N83-10521
Cell and module formation research area
p 41 N83-10522
Engineering sciences area and module performance and failure analysis area
p 41 N83-10523
Project analysis and integration area
p 41 N83-10524
Parabolic Dish Solar Thermal Power Annual Program Review, proceedings
[NASA-CR-169365] p 42 N83-10525
Development status of the PDC-1 Parabolic Dish Concentrator
p 42 N83-10526
The small community solar thermal power experiment
p 43 N83-10531
Recent tests on the Carter small reciprocating steam engines
p 43 N83-10536
Potential benefits from a successful solar thermal program
p 3 N83-10547
Configuration selection study for isolated loads using parabolic dish modules
p 45 N83-10548
Solar thermal technologies benefits assessment Objectives, methodologies and results for 1981
[NASA-CR-169373] p 4 N83-10551
User handbook for block IV silicon solar cell modules
[NASA-CR-169431] p 45 N83-10552
Photovoltaic module encapsulation design and materials selection, volume 1, abridged
[NASA-CR-169372] p 45 N83-10553
Antimisting kerosene atomization and flammability
[NASA-CR-169385] p 95 N83-12246
Frictional characteristics and heat transfer of antimisting fuels in tubes
[NASA-CR-169388] p 96 N83-12248
Solar thermal technology report, FY 1981 Volume 1 Executive summary
[NASA-CR-169526] p 55 N83-13581
Solar thermal technology report, FY 1981 Volume 2 Technical
[NASA-CR-169527] p 55 N83-13582
Price estimates for the production of wafers from silicon ingots
[NASA-CR-169517] p 55 N83-13583
Summary of flat-plate solar array project documentation Abstracts of published documents, 1975 to June 1982
[NASA-CR-169518] p 56 N83-13586
An assessment of gas-side fouling in cement plants
[NASA-CR-169513] p 15 N83-13644
Publications of the Jet Propulsion Laboratory, 1981
[NASA-CR-169519] p 170 N83-14016
Technical and economic assessment of processes for the production of butanol and acetone
[NASA-CR-169623] p 106 N83-14293
Large-area sheet task advanced dendritic web growth development
[NASA-CR-169624] p 58 N83-14665
A high temperature ceramic heat exchanger element for a solar thermal receiver
[NASA-CR-169625] p 58 N83-14666
Investigation of the hydrochlorination of SiCl₄
[NASA-CR-169621] p 58 N83-14668
Large-area sheet task advanced dendritic web growth development
[NASA-CR-169639] p 59 N83-14669
Investigation of reliability attributes and accelerated stress factors on terrestrial solar cells
[NASA-CR-169620] p 59 N83-14670
Development of an all-metal thick film cost effective metallization system for solar cells
[NASA-CR-169635] p 59 N83-14674
Large-area sheet task advanced dendritic web growth development
[NASA-CR-169637] p 59 N83-14675
Investigation of test methods, material properties and processes for solar cell encapsulants
[NASA-CR-169636] p 60 N83-14676
Feasibility study of solid surface subreflector production techniques
[NASA-CR-169642] p 60 N83-14678

Development of technique for AR coating nickel and copper metallization of solar cells FPS project product development

[NASA-CR-169616] p 60 N83-14679
Development of photovoltaic array and module safety requirements
[NASA-CR-169641] p 60 N83-14681
Investigation of the hydrochlorination of SiCl₄
[NASA-CR-169622] p 60 N83-14682
Advanced Czochralski silicon growth technology for photovoltaic modules
[NASA-CR-169661] p 61 N83-14685
Distributed photovoltaic systems Utility interface issues and their present status Intermediate/three-phase systems
[NASA-CR-169664] p 61 N83-14686
Solar cell radiation handbook
[NASA-CR-169662] p 61 N83-14687
Simulated space flight testing of commercial terrestrial silicon cells
p 69 N83-15811
Progress toward thin-film GaAs solar cells using a single-crystal Si substrate with a Ge interlayer
p 69 N83-15817
The course of solar array welding technology development
p 72 N83-15831
A preliminary evaluation of a potential space worth encapsulant
p 72 N83-15832
Blanket technology
p 72 N83-15838
Joint Center for Graduate Study, Richland, Wash.
Conceptual design and cost analysis of hydraulic output unit for 15 kW free-piston Stirling engine
[NASA-CR-165543] p 121 N83-10561
Joyce (T. J.) Associates, Fairfax, Va.
Assessment of research and development needs for methane fueled engine systems
[PB82-199035] p 97 N83-12257
JAYCOR, Alexandria, Va.
Perform experiments on LINUS-O and LTX imploding liquid liner fusion systems
[AD-A120052] p 154 N83-16214
JAYCOR, San Diego, Calif.
Computer modeling of mixing and agglomeration in coal-conversion reactors Volume 1 Model formulation
[DE82-014836] p 84 N83-10212

K**Kabelmetal Electro G.m.b.H., Hannover (West Germany).**

Flexible gas insulated cable for high power transmission
[BMFT-FB-T-82-099] p 158 N83-10370

Kajima Inst. of Construction Technology, Tokyo (Japan).

The solar assisted air-source heat pump system, part 1
[PB82-218439] p 39 N83-10286

Kaman Aerospace Corp., Bloomfield, Conn.

Design and fabrication of composite blades for the Mod-1 wind turbine generator
[NASA-CR-167987] p 128 N83-11579
The 40 kW intermediate SWECS program
p 148 N83-15925

Kansas State Univ., Manhattan.

Darneus wind-turbine and pump performance for low-lift irrigation pumping
[DE82-016270] p 131 N83-12564

Katholieke Universiteit te Leuven (Belgium)

Lift off A very fine front metallization geometry technique for high efficiency solar cells
p 62 N83-14701

Kayex Corp., Rochester, N. Y.

Advanced Czochralski ingot growth
p 40 N83-10509
Large-area silicon sheet task
p 41 N83-10520

Kernforschungsanlage, Juelich (West Germany).

Prototype solar house Study of the scientific evaluation and feasibility of a research and development project
[BMFT-FB-T-82-137] p 49 N83-11598

King Research, Inc., Rockville, Md.

Value of the energy data base
[DE82-014250] p 22 N83-16256

Konstanz Univ. (West Germany).

Investigation of new solar cells Part A Novel semiconductors and their suitability Part B Polycrystalline MIS diodes
[BMFT-FB-T-82-103] p 48 N83-10632

Kraftwerk Union A.G. Reaktortechnik, Erlangen (West Germany).

Hard coal gasification using catalysts dissolved in steam
[BMFT-FB-T-82-107] p 82 N83-10146

Kurchatov (I. V.) Inst. of Atomic Energy, Moscow (USSR).

Tokamak research in the Soviet Union
p 150 N83-16115

KB United Stirling AB & Co., Malmö (Sweden).

Modifications and testing of a 4-95 Stirling engine for solar applications p 44 N83-10538

L**Layton (J. Preston), Princeton Junction, N.J.**

Power conversion Overview p 145 N83-15898

Lincoln Housing Authority, Nebr.

Residential photovoltaic experiment station data system p 68 N83-14762

Lincoln Lab., Mass. Inst. of Tech., Lexington

Rooftop applications p 40 N83-10515

Engineering sciences area and module performance and failure analysis area p 41 N83-10523

J. F. Long experimental photovoltaic house p 50 N83-12547

Data report for the Northeast Residential Experiment Station, May 1982 p 51 N83-12553

Simulation of thermal aspects of residential photovoltaic systems p 51 N83-12555

Data report for the Southwest Residential Experiment Station, Mar 1982 p 52 N83-12556

Electrical aspects of photovoltaic-system simulation p 53 N83-12568

Data report for the Northeast Residential Experiment Station, Apr 1982 p 53 N83-12569

PV module degradation-analysis p 53 N83-12570

Microdistribution of oxygen in silicon and its effects on electronic properties p 71 N83-15825

Linde A.G., Holtriagekreuth (West Germany).

Refrigeration system of superconducting generators for large power plants p 120 N83-10369

BMFT-FB-T-82-071 p 120 N83-10369

Little (Arthur D.), Inc., Cambridge, Mass.

Two-phase heat transport for thermal control p 159 N83-15894

Liquid ribbon radiator for lightweight space radiator systems p 145 N83-15895

Logistics Management Inst., Washington, D. C.

Improving energy efficiency of major weapon systems [AD-A119563] p 18 N83-14116

Long (John F.) Properties, Inc., Phoenix, Ariz.

J. F. Long experimental photovoltaic house p 50 N83-12547

Los Alamos Scientific Lab., N. Mex.

Behavior of a plasma in a high-density gas-embedded Z-pinch configuration p 125 N83-10935

Parametric systems analysis of the Modular Stellarator Reactor (MSR) p 126 N83-10945

Superconducting-transmission-line project at the Los Alamos National Laboratory p 158 N83-12344

Equilibrium poloidal field distributions in reversed-field-pinch toroidal discharges p 134 N83-13996

Laser-isotope-separation technology p 104 N83-14197

The 30-MJ superconducting magnetic energy storage for BPA transmission-line stabilizer p 165 N83-14414

Numerical simulation of fluid flow in porous/fractured media p 107 N83-14454

Design and testing of a 13.75 MW converter for a superconducting magnetic-energy-storage system p 166 N83-14749

Power from the hot-dry-rock geothermal resource p 107 N83-14750

Multidimensional MHD computations for the field-reversed theta pinch and the reversed-field pinch p 139 N83-15142

Analysis of preburn three-dimensional flow patterns in underground coal conversion p 110 N83-15496

Methane hydrate gas production Evaluating and exploiting the solid gas resource p 110 N83-15498

High-current pulses from inductive energy stores p 167 N83-15587

Overview of space reactors p 142 N83-15855

Use of oxide decompositions in advanced thermochemical hydrogen cycles for solar heat sources p 142 N83-15855

Experimental results on the low-temperature reactions for the trivalent tetraoxide-cobalt monoxide pair p 77 N83-15958

ELMO Bumpy Torus fusion-reactor design study

[DE82-002388] p 154 N83-16218

Helios movable Hartmann ball p 155 N83-16220

Ion kinetic effects on the tilt mode in FRCs p 155 N83-16227

Application of fuel cells to highway and nonhighway transportation p 156 N83-16259

Louisiana State Univ., Baton Rouge

The development of a geopressed energy management information system in support of research planning, phase 1 p 91 N83-10638

[PB82-207366] p 91 N83-10638

Lunar and Planetary Inst., Houston, Tex.

A groundwater convection model for Rio Grande rift geothermal resources p 79 A83-11831

M**Marine Biological Lab., Woods Hole, Mass.**

Effects of oil on tundra ponds and streams p 15 N83-13649

Maryland Academy of Sciences, Baltimore.

Environmental Research Guiding Committee report [PB82-220070] p 6 N83-10661

Maschinenfabrik Augsburg-Nuernberg A.G., Munich (West Germany)

Tests with concentrating collectors p 47 N83-10626

Stationary flywheel energy storage systems p 165 N83-13637

[PB82-238130] p 165 N83-13637

Maschinenfabrik Augsburg-Nuernberg A.G., Augsburg (West Germany).

Test program for wind energy conversion system GROWIAN p 128 N83-11590

BMFT-FB-T-82-072 p 128 N83-11590

Massachusetts Inst. of Tech., Cambridge

Alternative electric generation impact simulator [PB82-180324] p 3 N83-10302

Radial effects in heating and thermal stability of a sub-ignited Tokamak p 124 N83-10932

Antenna-plasma coupling theory for ICRF heating of large tokamaks p 125 N83-10933

[DE82-013226] p 125 N83-10933

Lower hybrid RF current drive and electron-cyclotron heating on the Versator 2 Tokamak p 125 N83-10934

[DE82-017127] p 125 N83-10934

Observation of the parametric decay instability during electron cyclotron resonance heating on the Versator 2 Tokamak p 125 N83-10939

[DE82-012573] p 125 N83-10939

A review of the Energy Productivity Center's least cost energy strategy study p 11 N83-12591

[PB82-188111] p 11 N83-12591

Scale effects in liquefied fuel vapor dispersion p 11 N83-12659

[DE82-006198] p 11 N83-12659

Lower-hybrid-heating experiments on the Alcator C and the Versator II Tokamaks p 132 N83-13007

[DE82-013674] p 132 N83-13007

Estimation of resource and reserves p 103 N83-13631

[PB82-230954] p 103 N83-13631

Fuel and electricity generation from illumination of inorganic interfaces p 67 N83-14741

[AD-A119305] p 67 N83-14741

The MHD disk generator as a multimegawatt power supply operating with chemical and nuclear sources p 141 N83-15848

Preliminary analysis of wave energy conversion at an offshore structure p 146 N83-15903

McNeese State Univ., Lake Charles, La.

Standardization of sampling and analysis of geopressed fluids Part 2 Monitoring of geopressed wells p 82 N83-10151

Mechanical Technology, Inc., Latham, N. Y.

A 400-kWe high-efficiency steam turbine for industrial cogeneration p 43 N83-10537

A conceptual study of the potential for automotive-derived and free-piston Stirling engines in 30- to 400-kilowatt stationary power applications p 121 N83-10568

[NASA-CR-165274] p 121 N83-10568

Automotive Stirling Engine Mod 1 Design Review, volume 2 p 127 N83-10991

[NASA-CR-167936] p 127 N83-10991

Automotive Stirling engine development program p 140 N83-15176

[NASA-CR-167907-2] p 140 N83-15176

Automotive Stirling engine development program p 140 N83-15177

[NASA-CR-167907-1] p 140 N83-15177

Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).

A point focusing collector for an integrated water/power complex p 44 N83-10541

Moreland Associates, Fort Worth, Tex.**Miami Univ., Coral Gables, Fla.**

Proceedings of the 3rd Conference on Waste Heat Management and Utilization p 17 N83-13669

[PB82-227901] p 17 N83-13669

Michigan State Univ., East Lansing.

Measurements of energy distribution and thrust for microwave plasma coupling of electrical energy to hydrogen for propulsion p 75 A83-12508

[AIAA PAPER 82-1951] p 75 A83-12508

Michigan Univ., Ann Arbor

Study of the formation of submicron particulates generated by coal combustion p 21 N83-15401

[DE82-003268] p 21 N83-15401

Middle South Services, Inc., New Orleans, La.

Preliminary design study of compressed-air energy storage in a salt dome Volume 4 CAES turbomachinery design p 162 N83-12561

[DE82-019781] p 162 N83-12561

Middlesex County Dept. of Solid Waste Management, New Brunswick, N.J.

Institutional factors in resource recovery co-disposal demonstration project, Middlesex County, New Jersey, Spring 1980 - Summer 1981 p 4 N83-10588

Midland-Ross Corp., Toledo, Ohio.

Advanced regenerative heat recovery system p 8 N83-11604

[PB82-200650] p 8 N83-11604

Midwest Research Inst., Golden, Colo.

Evaluation of advanced R and D topics in photovoltaics p 41 N83-10518

Investigations of the tornado wind energy system p 121 N83-10601

[DE82-017122] p 121 N83-10601

ROSET A solar-thermal electric-power simulation users guide p 53 N83-12567

[DE82-021997] p 53 N83-12567

Structural design considerations for a line-focus reflective module using inexpensive composite materials p 54 N83-12587

[DE82-021611] p 54 N83-12587

Scatterplate flux mapping for solar concentrators p 54 N83-12588

[DE82-021359] p 54 N83-12588

Performance criteria for photovoltaic energy systems, volume 1 p 56 N83-13596

[DE82-021958] p 56 N83-13596

Performance criteria for photovoltaic energy systems, volume 2 p 56 N83-13597

[DE82-021683] p 56 N83-13597

An overview of Solar Industrial Process-Heat (SIPH) applications below 120 deg C p 57 N83-13603

[DE82-021360] p 57 N83-13603

Wind-energy program FY 1982 third quarterly review p 133 N83-13714

[DE82-019928] p 133 N83-13714

Fifth Biennial Wind Energy Conference and Workshop (WW5) p 146 N83-15908

[DE82-014659] p 146 N83-15908

The SERI wind energy program p 21 N83-15915

Television interference and acoustic emissions associated with the operation of the Darrieus VAWT p 149 N83-15934

Midwest Research Inst., Kansas City, Mo.

Evaluation of methods for rapid determination of freezing point of aviation fuels p 83 N83-10207

[NASA-CR-167981] p 83 N83-10207

An economic and engineering analysis of the full-scale trommel screen operations at Baltimore County, Maryland p 87 N83-10581

[DE82-013674] p 87 N83-10581

Milwaukee School of Engineering, Wis.

Break-in, performance and endurance tests results on fixed displacement hydraulic fluid power vane pumps p 128 N83-11504

[AD-A117962] p 128 N83-11504

Minnesota Univ., Minneapolis.

Design of plywood and paper flywheel rotors p 165 N83-14662

[DE82-002631] p 165 N83-14662

Missouri Univ., Columbia.

The fabrication and evaluation of a silicon photovoltaic cell with a directly nitrided tunnel insulator p 45 N83-10564

[AD-A120079] p 45 N83-10564

Mitre Corp., McLean, Va.

Estimation of aircraft fuel consumption p 1 A83-10186

[PB82-200650] p 1 A83-10186

Mobil Tyco Solar Energy Corp., Waltham, Mass.

Photovoltaic research needs industry perspective p 40 N83-10516

[DE82-002758] p 40 N83-10516

Large-area silicon sheet task p 41 N83-10520

Stress studies in EPG p 60 N83-14677

[NASA-CR-169640] p 60 N83-14677

Monsanto Research Corp., Dayton, Ohio.

Supern heat-transfer fluids for solar heating and cooling applications Results of acute oral-toxicity determinations p 52 N83-12560

[DE82-002758] p 52 N83-12560

Monsanto Research Corp., Miamisburg, Ohio.

Tritium waste control October 1980 - March 1981 p 20 N83-14774

[DE82-002088] p 20 N83-14774

Moreland Associates, Fort Worth, Tex.

Earth-covered buildings An exploratory analysis for hazard and energy performance p 10 N83-12285

[PB82-189564] p 10 N83-12285

Mound Lab., Miamisburg, Ohio.

- Physical and chemical characterization of devonian gas shale
[DE82-002560] p 111 N83-15802
- Mueller Associates, Inc., Baltimore, Md**
Status of alcohol-fuels-utilization technology for highway transportation A 1981 perspective Volume 1 Spark-ignition engines
[DE82-020493] p 96 N83-12255
- Municipal Environmental Research Lab., Cincinnati, Ohio.**
Technology assessment of anaerobic systems for municipal wastewater treatment Part 1 Anaerobic fluidized bed Part 2 ANFLOW
[PB82-229170] p 17 N83-13670

N**Naemnden foer Energiproduktionsforskning, Stockholm (Sweden).**

- Interaction in limited arrays of windmills
[DE82-750056] p 133 N83-13608
- Nagoya Univ. (Japan).**
Sausage instability of Z-discharged plasma channel in LIB-fusion device
[IPPJ-602] p 123 N83-10917
- Plasma equilibrium and field diffusion during current rise phase of STP-2 screw pinch Tokamak
[IPPJ-594] p 123 N83-10919
- US-Japan Joint Institute for Fusion Theory Workshop on Nonequilibrium Statistical Physics Problems in Fusion Plasmas Stochasticity and Chaos
[IPPJ-587] p 123 N83-10920
- US-Japan Workshop on Burning Plasma Physics and Engineering
[IPPJ-599] p 124 N83-10921
- US-Japan Joint Institute for Fusion Theory Workshop on Equilibrium, Stability and Transport of Nonaxisymmetric Systems
[IPPJ-577] p 124 N83-10922
- Analysis of stabilization effect of quadrupole field on theta pinch plasmas
[IPPJ-608] p 131 N83-12995
- Sufficient stability condition for alpha-driven velocity-space modes in compression Tokamak
[IPPJ-609] p 131 N83-12996
- Comments on thermal runaway experiments in sub-ignition Tokamaks
[IPPJ-610] p 131 N83-12997
- Analysis of target implosion irradiated by proton beam
1. Beam interaction with target plasma
[IPPJ-612] p 134 N83-13989
- Non-circular bumpy torus
[IPPJ-607] p 134 N83-13990
- Proceedings of International Topical Meeting on ICF Research by Light-Ion Beam
[IPPJ-611] p 138 N83-15126

Nairobi Univ. (Kenya).

- The climate of Africa, including feasibility study of climate alert system p 170 N83-12737

National Academy of Sciences - National Research Council, Washington, D. C.

- Aviation turbine fuels An assessment of alternatives
[NASA-CR-169395] p 84 N83-10214
- Proceedings of a Symposium on High Energy Density Capacitors and Dielectric Materials
[PB82-197344] p 160 N83-10373
- NO sub x emission control for heavy duty vehicles
Toward meeting a 1986 standard
[PB82-183880] p 7 N83-10665
- Arctic terrestrial environmental research programs of the Office of Energy Research, Department of Energy Evaluation and recommendations Appendix A Terrestrial environmental research in Alaska during 1980-1981
[PB82-197096] p 9 N83-11633
- Arctic terrestrial environment research programs of the Office of Energy Research, Department of Energy Evaluation and recommendations
[PB82-197088] p 9 N83-11634
- Atmosphere-biosphere interactions Toward a better understanding of the ecological consequences of fossil fuel combustion
[PB82-182098] p 12 N83-12672
- Understanding the Arctic Sea floor for engineering purposes
[AD-A119773] p 108 N83-14877
- Studies leading to the development of high-rate lithium sulfuryl chloride battery technology
[AD-A120002] p 146 N83-15907
- National Aeronautics and Space Administration, Washington, D. C.**
Second program on energy research and technologies
[NASA-TM-77154] p 13 N83-13587
- NASA space photovoltaic research and technology programs p 64 N83-14713

- NASA-OAST program in photovoltaic energy conversion p 68 N83-15807
- National Aerospace Lab., Amsterdam (Netherlands).**
General introduction to wind energy conversion
[NLR-MP-81014-U] p 130 N83-12527
- National Aerospace Lab., Tokyo (Japan).**
An experimental study of an aerodynamically optimum windmill
[NAL-TR-698] p 129 N83-12522
- National Building Research Inst., Pretoria (South Africa).**
The prediction of the thermal performance of building by the CR-method
[CSIR-BRR-396] p 161 N83-11578
- National Bureau of Standards, Washington, D. C.**
Use of thermocapillary migration in a controllable heat valve p 156 A83-16093
- Analysis of thermal comfort in a passive solar heated residence
[PB82-180142] p 39 N83-10297
- Economic efficiency in the sizing of residential heat pumps
[PB82-179029] p 3 N83-10401
- A laboratory approach to obtain suspension combustion data for reuse derived fuels p 87 N83-10579
- An oxygen flow calorimeter for determining the heating value of kilogram size samples of municipal solid waste p 87 N83-10580
- Characterization of RDF properties through high pressure differential scanning calorimetry p 87 N83-10582
- Solar availability in cities and towns A computer model
[PB82-202201] p 49 N83-11608
- Thermodynamic data for desulfurization processes
[PB82-184904] p 95 N83-12207
- Analytical and experimental analysis of procedures for testing solar domestic hot water systems
[PB82-184839] p 49 N83-12287
- Comparative analysis of economic models in selected solar energy computer programs
[PB82-184995] p 55 N83-12589
- TI-59 program for calculating the annual energy requirements for residential heating and cooling Volume 1 Users manual
[DE82-010174] p 13 N83-13594
- TI-59 program for calculating the annual energy requirements for residential heating and cooling Volume 2 Program reference manual
[DE82-020275] p 13 N83-13595
- A comparison of unglazed flat plate liquid solar collector thermal performance using the ASHRAE Standard 96-1980 and modified BSE test procedures
[PB82-237660] p 58 N83-13632
- National Center for Resource Recovery, Washington, D. C.**
Investigation of engineering and design considerations in selecting conveyors for densified Refuse-Derived Fuel (dRDF) and dRDF Coal mixtures
[AD-A119065] p 107 N83-14495
- National Coal Board, Leatherhead (England).**
Fluidised-bed combustion Combustion of run-of-mine coal in a 12-inch-diameter pressurized fluidised-bed combustor
[DE82-018786] p 95 N83-12204
- National Fertilizer Development Center, Muscle Shoals, Ala.**
The Tennessee Valley Authority's biomass fuels program
[DE81-904161] p 109 N83-15495
- National Hydroelectric Power Corp. Ltd., New Delhi (India).**
Seminar on Accelerated Hydroelectric Development in India. Proceedings, volume 1
[PB82-217753] p 122 N83-10634
- Seminar on Accelerated Hydroelectric Development in India Post session proceedings, volume 2
[PB82-217761] p 122 N83-10635
- National Materials Advisory Board, Washington, D. C.**
An assessment of the industrial energy conservation program, volume 2
[PB82-225780] p 15 N83-13630
- Assessment of research needs for advanced battery systems
[PB82-227349] p 165 N83-13634
- National Research Council of Canada, Ottawa (Ontario).**
Measurements on the Magdalen Islands VAWT and future projects p 148 N83-15929
- National Taiwan Univ., Taipei**
The wind program in a typhoon environment p 148 N83-15927

National Telecommunications and Information Administration, Boulder, Colo.

- Instrument landing system localizer receiver performance in the presence of co-channel interference
[AD-A118909] p 99 N83-13089

National Weather Service, Silver Spring, Md.

- Climatic aspects of planning impoundments and hydropower operations p 99 N83-12754

Naval Civil Engineering Lab., Port Hueneme, Calif.

- Operating and maintenance experience with a 6-kW wind energy conversion system at Naval Station, Treasure Island, California
[AD-A119389] p 136 N83-14740

Naval Postgraduate School, Monterey, Calif.

- The use of buoyancy to lift heavy objects from the sea
[AD-A119320] p 106 N83-14306

Naval Research Lab., Washington, D. C.

- Lower hybrid RF current drive and electron-cyclotron heating on the Versator 2 Tokamak
[DE82-017127] p 125 N83-10934
- Pyrolysis of organic compounds containing long unbranched alkyl groups
[AD-A119749] p 104 N83-14165
- The effect of additives on the aerosolization of JP-5 jet fuel
[AD-A119324] p 106 N83-14294
- Ceramics for high power sources in space p 171 N83-15881

- Structural characterization of materials for high energy space systems p 171 N83-15883

Naval Surface Weapons Center, White Oak, Md.

- Development of improved separators for alkaline zinc batteries
[AD-A119150] p 166 N83-14743

Naval Weapons Center, China Lake, Calif.

- Flat plate photovoltaic power systems Description, design and cost
[AD-A120814] p 73 N83-15902

Nebraska Univ., Lincoln.

- Diffusion length measurements in solar cells An analysis and comparison of techniques p 69 N83-15812

Nevada Univ., Reno

- Low- to moderate-temperature geothermal resource assessment for Nevada Area specific studies, Pumpernickel Valley, Carlin and Moana
[DE82-018598] p 98 N83-12584

New Mexico Energy Inst., Las Cruces.

- Data report for the Southwest Residential Expenment Station, Mar. 1982
[DE82-020400] p 52 N83-12556

New Mexico State Univ., Las Cruces.

- A groundwater convection model for Rio Grande nft geothermal resources p 79 N83-11831

New Mexico Univ., Albuquerque

- Study of the photovoltaic effect in thin film barium titanate p 46 N83-10567

- Performance of labyrinth-stratified water-storage system for heating and cooling
[DE82-000107] p 168 N83-15946

New York State Energy Research and Development Authority, Albany.

- Landfill gas recovery An analysis of results p 89 N83-10596

Newcomb and Boyd, Atlanta, Ga.

- Controlling energy consumption in single buildings
[AD-A118898] p 19 N83-14739

North Carolina Agricultural and Technical State Univ., Greensboro.

- Solar-cell testing and evaluation
[DE82-016179] p 52 N83-12562

North Carolina State Univ., Raleigh

- Evaluation of olivine ceramic refractories for thermal-energy-storage application
[DE82-000108] p 168 N83-15947

North Dakota Geological Survey, Grand Forks

- Computer management of geologic and petroleum data at the North Dakota Geological Survey
[DE82-904385] p 103 N83-13694

North Texas State Univ., Denton.

- Urban waste as a potential source for brick plants p 88 N83-10591

Northern Energy Corp., Boston, Mass

- Small-scale waste-to-energy systems A state-of-the-art report p 4 N83-10583

National Aeronautics and Space Administration Ames Research Center, Moffett Field, Calif

- The satellite power system - Assessment of the environmental impact on middle atmosphere composition and on climate p 2 A83-14517

National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.

- OAO-3 end of mission power subsystem evaluation
[NASA-TM-83959] p 161 N83-11580

Heat pipe thermal switch
[NASA-CASE-GSC-12812-1] p 159 N83-12525

Anisotropy in MHD turbulence due to a mean magnetic field
[NASA-TM-84000] p 131 N83-12998

Lithium/sulfur dioxide cell and battery safety
[NASA-RP-1099] p 135 N83-14684

National Aeronautics and Space Administration.
Langley Research Center, Hampton, Va.

Economic modeling of fault tolerant flight control systems in commercial applications p 1 A83-11156

Layered transition metal thiophosphates /MPX3/ as photoelectrodes in photoelectrochemical cells p 33 A83-15483

Radiant heating tests of several liquid metal heat-pipe sandwich panels
[AIAA PAPER 83-0319] p 157 A83-16649

NECAP 4 1 NASA's Energy-Cost Analysis Program fast input manual and example
[NASA-TM-83241] p 4 N83-10566

GaAs solar cells p 72 N83-15836

Radiation-driven MHD systems for space applications p 144 N83-15867

Materials technology for large space structures p 171 N83-15882

National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

End region effects upon the performance of a magnetohydrodynamic channel p 113 A83-10665

Combustion characteristics of hydrogen-carbon monoxide based gaseous fuels p 78 A83-11491

NOx results from two combustors tested on medium BTU coal gas p 78 A83-11493

Optimal sun-alignment techniques of large solar arrays in electric propulsion spacecraft
[AIAA PAPER 82-1898] p 25 A83-12475

Measurements of energy distribution and thrust for microwave plasma coupling of electrical energy to hydrogen for propulsion
[AIAA PAPER 82-1951] p 75 A83-12508

A review of resonance response in large, horizontal-axis wind turbines p 114 A83-13696

Planar multijunction high voltage solar cell chip p 30 A83-13923

Methods of reducing energy consumption of the oxidant supply system for MHD/steam power plants
[AIAA PAPER 83-0468] p 118 A83-16735

Pore size engineering applied to starved electrochemical cells and batteries
[NASA-TM-82893] p 119 N83-10134

Polyvinyl alcohol membranes as alkaline battery separators
[NASA-TM-82961] p 119 N83-10135

Literature survey of properties of syngases derived from coal
[NASA-TM-82739] p 83 N83-10208

Method for depositing an oxide coating
[NASA-CASE-LEW-13131-1] p 39 N83-10494

The effect of Ta2O5 on the interaction between silicon and its contact metallization
[NASA-TM-82948] p 45 N83-10554

Evaluation of electrode shape and nondestructive evaluation method for welded solar cell interconnects
[NASA-TM-82966] p 45 N83-10555

Combustion of coal gas fuels in a staged combustor
[NASA-TM-82987] p 85 N83-10556

Evaluation of advanced combustion concepts for dry NO sub x suppression with coal-derived, gaseous fuels
[NASA-TM-82985] p 85 N83-10557

Expected cycle life versus depth of discharge relationships of well behaved single cells and cell strings
[NASA-TM-82957] p 160 N83-10558

Multifuel evaluation of rich/lean/lean combustor
[NASA-TM-82986] p 86 N83-10559

Combustion characteristics of hydrogen Carbon monoxide based gaseous fuels
[NASA-TM-82998] p 76 N83-10560

Radiation damage in front and back illuminated high resistivity silicon solar cells
[NASA-TM-82965] p 48 N83-10962

Cold-air performance of compressor-drive turbine of Department of Energy upgraded automobile gas turbine engine 2 Stage performance
[NASA-TM-82818] p 127 N83-11063

Recent trends in aviation turbine fuel properties
[NASA-TP-2056] p 92 N83-11340

Solar cell having improved back surface reflector
[NASA-CASE-LEW-13620-1] p 55 N83-13579

Methods of reducing energy consumption of the oxidant supply system for MHD/steam power plants
[NASA-TM-83025] p 133 N83-13589

The NASA Redox Storage System Development project, 1980
[NASA-TM-82940] p 166 N83-14683

The effect of yaw on horizontal axis wind turbine loading and performance
[NASA-TM-82778] p 136 N83-14688

Measured performance of a tip-controlled, teetered rotor with an NACA 64 sub 3-618 tip airfoil
[NASA-TM-82870] p 136 N83-14689

DOE/NASA Lewis large wind turbine program
[NASA-TM-82991] p 136 N83-14690

Assessment of alternative power sources for mobile mining machinery
[NASA-TM-82695] p 136 N83-14691

Heat transparent high intensity high efficiency solar cell
[NASA-CASE-LEW-12892-1] p 61 N83-14692

Large area low-cost space solar cell development p 62 N83-14699

On the cause of the flat-spot phenomenon observed in silicon solar cells at low temperatures and low intensities p 63 N83-14705

Effects of processing and dopant on radiation damage removal in silicon solar cells p 63 N83-14708

Determination of optimum sunlight concentration level in space for 3-5 cascade solar cells p 66 N83-14732

Research and technology, Lewis Research Center
[NASA-TM-83038] p 167 N83-15169

Development and evaluation of polyvinyl-alcohol blend polymer films as battery separators
[NASA-TM-82981] p 167 N83-15372

Catalytic combustion with steam injection
[NASA-TM-82923] p 111 N83-15605

Determination of optimum sunlight concentration level in space for 3-5 cascade solar cells p 69 N83-15814

Solar energy conversion using surface plasmons for broadband energy transport p 69 N83-15815

The effect of different solar simulators on the measurement of short-circuit current temperature coefficients p 70 N83-15821

Radiation damage and annealing in large area n+/p/p+ GaAs shallow homojunction solar cells p 71 N83-15826

Microstructural analysis of solar cell welds p 72 N83-15833

Evaluation of solar cell welds by scanning acoustic microscopy p 72 N83-15834

Radiation damage p 72 N83-15837

The worldwide market for photovoltaics in the rural sector
[NASA-TM-83035] p 73 N83-15840

NASA Lewis Research Center combustion MHD experiment p 141 N83-15847

A proposed optical pumping system requiring no electric power p 143 N83-15861

Direct conversion of infrared radiant energy for space power applications p 73 N83-15865

Overview of high-temperature materials for high-energy space power systems p 144 N83-15869

Deep impurity trapping concepts for power semiconductor devices p 170 N83-15877

Growth of diamondlike films for power applications p 170 N83-15880

The NASA Lewis large wind turbine program p 146 N83-15911

Operating experience with the 200 kW MOD-OA wind turbine generators p 147 N83-15916

Analysis of combustion spectra containing organ pipe tone by cepstral techniques
[NASA-TM-83034] p 77 N83-16153

National Aeronautics and Space Administration.
Lyndon B. Johnson Space Center, Houston, Tex.

Radar and infrared remote sensing of geothermal features at Pilgrim Springs, Alaska p 79 A83-12036

Gas-to-hydraulic power converter
[NASA-CASE-MSC-18794-1] p 136 N83-14693

National Aeronautics and Space Administration.
Marshall Space Flight Center, Huntsville, Ala.

Longwall shearer tracking system
[NASA-CASE-MFS-25717-1] p 107 N83-14607

The swing to concentrator arrays p 61 N83-14695

NASA solar array flight experiment p 65 N83-14722

National Aeronautics and Space Administration.
Pasadena Office, Calif.

Thermal reactor
[NASA-CASE-NPO-14369-1] p 75 N83-10501

National Aeronautics and Space Administration.
Wallops Flight Center, Wallops Island, Va.

Experimental feasibility of the airborne measurement of absolute oil fluorescence spectral conversion efficiency p 169 A83-15851

Oak Ridge Associated Universities, Inc., Washington, D.C.

Geothermal-resource survey of the Tennessee Valley Region
[DE82-021951] p 98 N83-12706

Oak Ridge Gaseous Diffusion Plant, Tenn.

Hydrogeochemical and stream-sediment reconnaissance basic data for Utica quadrangle, New York Uranium Resource Evaluation Project
[DE82-020429] p 102 N83-13552

Hydrogeochemical and stream-sediment reconnaissance basic data for Marion, Canton, Pittsburgh and Cleveland quadrangles, Ohio, West Virginia, Pennsylvania Uranium Resource Evaluation Project
[DE82-020430] p 102 N83-13553

Hydrogeochemical and stream-sediment reconnaissance basic data for Beaumont, Lake Charles and Baton Rouge quadrangles, Texas, Louisiana Uranium Resource Evaluation Project
[DE82-020438] p 102 N83-13554

Hydrogeochemical and stream-sediment reconnaissance basic data for Ogdensburg and Lake Champlain quadrangles, New York, Vermont Uranium Resource Evaluation Project
[DE82-020417] p 102 N83-13557

Oak Ridge National Lab., Tenn.

ANFLOW Characterization and development of an energy conserving wastewater treatment system p 4 N83-10585

Curvilinear coordinates for magnetic confinement geometries
[DE82-019733] p 124 N83-10928

Rippling modes in the edge of a Tokamak plasma
[DE82-007724] p 125 N83-10940

Resistive MHD studies of high-beta Tokamak plasmas
[DE82-008101] p 126 N83-10942

Fusion reactor plasma-performance modeling
POPCON analysis p 126 N83-10943

Second-cyclotron-harmonic emission measurements on ISX-B
[DE82-009938] p 126 N83-10949

Faraday-rotation measurements in ISX-B
[DE82-011507] p 127 N83-10953

Neutral-beam deposition in large, finite-beta noncircular Tokamak plasmas
[DE82-008146] p 127 N83-10957

Photosynthetic water splitting
[PB82-200684] p 76 N83-12206

Computational methods in Tokamak transport
[DE82-016616] p 132 N83-13006

Stress-corrosion studies in coal-liquefaction environments
[DE82-001464] p 100 N83-13240

Biomedical and environmental sciences programs at the Oak Ridge National Laboratory
[DE82-019897] p 13 N83-13516

Analysis of treated sludges and associated leachates from coal-conversion facilities
[DE82-001488] p 103 N83-13650

Fusion research at ORNL
[DE82-017766] p 134 N83-13994

ORNL integral experiment to provide data for evaluating magnetic-fusion-energy shielding concepts Part 1
Attenuation measurements p 135 N83-13999

Chemicals enhanced oil recovery
[DE82-003475] p 105 N83-14206

Health effects research in direct coal liquefaction
Studies of H-coal distillates Phase 1 PDU samples, the effects of hydrotreatment
[DE82-003702] p 18 N83-14302

Industrial thermal energy storage What are the possibilities?
[DE82-001494] p 166 N83-14748

Effects of acid precipitation on elemental transport from terrestrial to aquatic ecosystems
[DE82-002739] p 20 N83-14778

Resistive MHD studies of high-beta-Tokamak plasmas
[DE82-001478] p 139 N83-15141

Corrosion in fractionation systems
[DE82-001441] p 109 N83-15427

Modification of feed/effluent flow work exchangers for slurry service and power recovery in coal liquefaction processes
[DE82-004114] p 110 N83-15499

Technological boundary conditions for nuclear electric space power plants p 142 N83-15856

The ORNL Thermal Energy Storage Program Technical support
[DE81-030805] p 168 N83-15943

The ORNL Thermal Energy Storage Program
[DE81-032001] p 168 N83-15944

- Mathematical modeling of TES subsystems
[DE82-000168] p 168 N83-15950
- Alternative means of coping with national energy emergencies
[DE82-002812] p 21 N83-15955
- Once-through heat transport and seasonal storage for city of Bellingham
[DE82-001501] p 169 N83-15956
- USDOE activities in low-level radioactive waste treatment
[DE82-001450] p 22 N83-16195
- Authors guide to publishing in the fields of plasma physics and controlled fusion
[DE82-002866] p 155 N83-16230
- Engineering features of the INTOR conceptual design
[DE82-002808] p 156 N83-16232
- CAMAC based inter-computer communications system
[DE82-002879] p 156 N83-16233
- Occidental Research Corp., Irvine, Calif.**
Study of ion beam-initiated inertial-confinement fusion
[DE82-013935] p 124 N83-10931
- Office of Technology Assessment, Washington, D.C.**
Increased automobile fuel efficiency and synthetic fuels
Alternatives for reducing oil imports
[OTA-E-186] p 12 N83-13270
- Technology and Soviet energy availability Summary
[OTA-ISC-154] p 13 N83-13584
- Oklahoma Univ., Norman.**
Development of geothermal binary-cycle working-fluid properties Information and analysis of cycles
[DE82-021542] p 102 N83-13602
- Old Dominion Univ., Norfolk, Va.**
Hybrid thermoelectric solar collector design and analysis
[AD-A120558] p 27 N83-13482
- One America, Inc., Washington, D.C.**
Questions and answers about energy recovery from waste
[DE82-022154] p 10 N83-12580
- Optical Coating Lab., Inc., Santa Rosa, Calif.**
Textured solar cell covers for light weight and high performance
[DE82-001478] p 66 N83-14728
- Oregon Inst. of Tech., Klamath Falls.**
Community heat-pump system, Klamath County, Oregon
[DE82-015106] p 5 N83-10600
- Basin view geothermal heating district, Klamath Falls, Oregon Conceptual design and economic-feasibility study report
[DE82-015108] p 93 N83-11587
- Ottawa (Toru), Muncie, Ind.**
Development of a slide program describing a site selection process for small Wind-Energy-Conversion Systems (SWECS)
[DE82-017394] p 99 N83-12788

P

- Pacific Northwest Lab., Richland, Wash.**
Evaluation of solar-air-heating central-receiver concepts
[DE82-016924] p 48 N83-11586
- A survey of spectral response measurements for photovoltaic devices
[DE82-006221] p 50 N83-12545
- Candidate wind-turbine-generator site Data summary
[DE82-020416] p 99 N83-12785
- Aquifer stability investigation
[DE82-003831] p 166 N83-14754
- Advanced concepts The second generation of compressed air-energy storage technology
[DE82-003838] p 167 N83-14755
- Environmental and regulatory aspects of compressed-air energy storage
[DE82-003868] p 19 N83-14757
- Economic comparison of CAES designs employing hardrock, salt and aquifer storage reservoirs
[DE82-003833] p 167 N83-14758
- The wind characteristics program
[DE82-003833] p 111 N83-15910
- Pennsylvania State Univ., University Park**
Performance and emissions characteristics of aqueous alcohol furnaces in a DI diesel engine
[NASA-CR-167917] p 96 N83-12250
- Fumigation of alcohol in a light duty automotive diesel engine
[NASA-CR-167915] p 100 N83-13272
- Expansion of coal-preparation-plant simulator
[DE82-001576] p 106 N83-14301
- Development of instrumental methods of analysis of sulfur compounds in coal process streams
[DE82-003253] p 108 N83-14775
- Development of instrumental methods of analysis of sulfur compounds in coal-process streams
[DE82-003291] p 20 N83-14776

- Pennsylvania Univ., Philadelphia.**
Research possibilities? No! Needs for research to make PV solar energy utilization broadly competitive
[DE82-001450] p 40 N83-10517
- Cell and module formation research area
[DE82-001450] p 41 N83-10522
- New silicon cell design concepts for 20 percent AMI efficiency
[DE82-001450] p 68 N83-15808
- Photowatt International, Inc., Tempe, Ariz.**
Cell and module formation research area
[DE82-001450] p 41 N83-10522
- Development of technique for AR coating nickel and copper metallization of solar cells FPS project product development
[NASA-CR-169616] p 60 N83-14679
- Physikalisch-Technische Studien G.m.b.H., Freiburg (West Germany).**
Loss currents of solar cells under Low Earth Orbit (LEO) conditions
[DE82-018269] p 65 N83-14721
- Pilkington Bros. Ltd., Ormskirk (England).**
CMX-50 A new ultra thin solar cell cover for lightweight arrays
[DE82-018269] p 66 N83-14726
- Pittsburgh Mining Technology Center, Pa.**
Fossil-energy
[DE82-018269] p 86 N83-10570
- Pittsburgh Univ.,**
Losses in chopper-controlled DC series motors
[NASA-CR-167845] p 133 N83-13359
- Placer Amex, Inc., San Francisco, Calif.**
Coal to methanol feasibility study Beluga methanol project Volume 4 Environmental
[DE82-006057] p 10 N83-12542
- Power Conversion, Inc., Elmwood, N.J.**
Primary lithium organic electrolyte battery BA-5588
[AD-A120558] p 146 N83-15900
- Power Kinetics, Inc., Troy, N.Y.**
The PKI collector
[DE82-019993] p 42 N83-10528
- Princeton Univ., N J**
Measurements of fusion reactions from a Tokamak plasma
[DE82-002831] p 124 N83-10926
- High-n collisionless ballooning modes in axisymmetric toroidal plasmas
[DE82-002831] p 154 N83-16217
- Effect of low-frequency density fluctuations on ion-cyclotron waves
[DE82-002829] p 155 N83-16222
- Public Service Co. of Indiana, Plainfield.**
Compressed-air energy storage preliminary design and site-development program in an aquifer Volume 1 Executive summary
[DE82-019284] p 164 N83-13610
- Compressed-air energy storage preliminary design and site-development program in an aquifer Volume 2 Utility-system planning
[DE82-019993] p 164 N83-13611
- Purdue Univ., Lafayette, Ind.**
High-intensity solar cells
[DE82-020420] p 51 N83-12550
- Thermal energy storage testing facilities
[DE82-000110] p 168 N83-15948
- Purkyně (J E) Univ., Kottarska (Czechoslovakia).**
Coating of laser fusion targets by plasma polymerized organic thin films
[DE82-001478] p 152 N83-16126
- PIDC-Energy Development Corp., Philadelphia, Pa.**
The feasibility of refuse-fired energy generation in Philadelphia, Pennsylvania
[DE82-001478] p 88 N83-10587
- PSE and G Research Corp., Newark, N.J.**
Sewage sludge as a supplementary utility boiler fuel
[DE82-001478] p 88 N83-10590

R

- R and D Associates, Arlington, Va**
Research needs Prime-power for high energy space systems
[AD-A119243] p 135 N83-14156
- R and D Associates, Marina Del Rey, Calif**
The satellite power system - Assessment of the environmental impact on middle atmosphere composition and on climate
[DE82-001478] p 2 A83-14517
- Concept evaluation of automotive propulsion using liquid air/nitrogen, task 5 report
[DE82-001478] p 129 N83-12439
- R and D Associates, Rosslyn, Va**
Proceedings of the AFOSR Special Conference on Prime-Power for High Energy Space Systems, volume 1
[AD-A118887] p 140 N83-15841
- MHD power Overview
[DE82-001478] p 140 N83-15846
- Proceedings of the AFOSR Special Conference on Prime-Power for High Energy Space Systems, volume 2
[AD-A118888] p 143 N83-15860
- Radian Corp., Austin, Tex**
Impact of NOx selective catalytic reduction processes on flue gas cleaning systems
[PB82-240086] p 16 N83-13664

- Radian Corp., Durham, N.C.**
Mechanisms of dry SO2 control processes
[PB82-196924] p 12 N83-12668
- Radian Corp., McLean, Va.**
Source test and evaluation report Alcohol facility for gasohol production
[PB82-237041] p 101 N83-13280
- Rasor Associates, Inc., Sunnyvale, Calif.**
Effects of reactor design, component characteristics and operating temperatures on direct conversion power systems
[DE82-001478] p 142 N83-15857
- Status of thermoelectric laser energy conversion, TELEC
[DE82-001478] p 143 N83-15864
- Thermionic conversion for space power application
[DE82-001478] p 144 N83-15886
- Raytheon Co., Bedford, Mass.**
Power conditioning subsystem design
[AD-A117736] p 121 N83-10569
- Reading Univ. (England)**
Recent progress in the development of the Musgrove vertical axis wind turbine
[DE82-001478] p 149 N83-15937
- Rensselaer Polytechnic Inst., Troy, N. Y.**
Neutron attenuation in the laser ducts of an inertial-confinement fusion reactor
[DE82-007195] p 126 N83-10947
- Digital image transmission and coding
[DE82-007195] p 127 N83-11397
- Diffused P+-N solar cells in bulk GaAs
[DE82-007195] p 69 N83-15818
- Research Inst. of Electrical Apparatus, Brno (Czechoslovakia).**
Equidistomietrical evaluation of a film record of an SF6 switching arc
[DE82-007195] p 153 N83-16136
- Research Inst. of National Defence, Stockholm (Sweden).**
Running hot water A systems approach to energy conservation
[FOA-C-10202-M2] p 5 N83-10628
- Seismology, 1981, nuclear test ban verification Earthquake and Earth resource investigation
[FOA-C-20460-T1] p 104 N83-13695
- Research Triangle Inst., Research Triangle Park, N.C.**
Boiler efficiency and emissions testing using Refuse-Derived Fuel (RDF) and coal
[AD-A119291] p 19 N83-14772
- Rheinische Braunkohlenwerke A.G., Cologne (West Germany).**
Prototype plant for Nuclear Process Heat (NPH), reference phase R and D work on Hydrogenated Coal Gasification (HCG) Further operation of semi-industrial plant for hydrogenated coal gasification
[BMFT-FB-T-82-098] p 90 N83-10625
- Rice Univ., Houston, Tex**
Phase equilibrium studies for methane/synthesis gas separation The hydrogen-carbon monoxide-methane system
[PB82-200637] p 95 N83-12208
- The phototron A light to RF energy conversion device
[DE82-001478] p 143 N83-15866
- Interaction between the SPS solar power satellite solar array and the magnetospheric plasma
[DE82-001478] p 73 N83-15868
- Riso National Lab., Roskilde (Denmark).**
On the power regulation of small wind turbines based on experience with small Danish wind turbines
[DE82-001478] p 148 N83-15926
- Rockwell International Corp., Golden, Colo.**
Safety data for small wind systems
[DE82-015400] p 131 N83-12565
- Rocky Flats small wind systems program An update
[DE82-001478] p 146 N83-15912
- Rockwell International Corp., Newbury Park, Calif**
Quality assurance in support of energy related monitoring activities
[PB82-234238] p 16 N83-13657
- Rockwell International Corp., Thousand Oaks, Calif.**
Efficiency-improvement study for GaAs solar cells
[DE82-016410] p 48 N83-11585
- Advances in large-diameter liquid encapsulated Czochralski GaAs
[DE82-001478] p 70 N83-15819
- Rolls-Royce Ltd., Derby (England).**
The fuel efficient jet engine
[PNR-90114] p 7 N83-11136
- Rome Air Development Center, Hanscom AFB, Mass.**
Defect behavior in electron-irradiated boron- and gallium-doped silicon
[DE82-001478] p 70 N83-15823
- Ross (Bernd) Associates, San Diego, Calif**
Cell and module formation research area
[DE82-001478] p 41 N83-10522
- Development of an all-metal thick film cost effective metallization system for solar cells
[NASA-CR-169635] p 59 N83-14674
- Royal Aircraft Establishment, Farnborough (England).**
Omnidirectional proton radiation of thin and thick solar cells
[DE82-001478] p 63 N83-14709

- Royal Netherlands Aircraft Factories Fokker, Amsterdam.**
Advanced rigid array p 62 N83-14697
- Royal Netherlands Aircraft Factories Fokker, Schiphol-Oost.**
Further developments of the ECS solar array p 64 N83-14715
Extendible and retractable masts for solar array developments p 65 N83-14725
- Ruhrkohle A.G., Essen (West Germany).**
Development, construction, and experimental operation of an improved chainless haulage system for drum-shearer loaders [BMFT-FB-T-82-102] p 158 N83-10428
Pneumatic stowing with lateral discharge in coal faces with thick seams [BMFT-FB-T-82-074] p 90 N83-10617
- Rycon, Inc., Cincinnati, Ohio.**
Performance analysis of cofining densified refuse derived fuel in a military boiler [AD-A118022] p 93 N83-11583

S

- Saab-Scanla, Linköping (Sweden).**
Aerodynamic analysis of horizontal axis wind turbines p 130 N83-12530
- Saarberg-Fernwaerme G.m.b.H., Saarbruecken (West Germany).**
SFW-Funk process for gasification of solid urban and industrial waste [BMFT-FB-T-82-117] p 16 N83-13651
Measuring program for the R and D project on gasification of domestic and industrial wastes [BMFT-FB-T-82-118] p 16 N83-13652
- Saarberg-Hoelter-Umwelttechnik G.m.b.H., Saarbruecken (West Germany).**
Reconstruction and testing of the flue gas desulfurizing plant Weiher 2 [BMFT-FB-T-82-108] p 91 N83-10652
- San Jose State Univ., Calif.**
The satellite power system - Assessment of the environmental impact on middle atmosphere composition and on climate p 2 A83-14517
- Sanders Associates, Inc., Nashua, N. H.**
Ceramic high temperature receiver design and tests p 44 N83-10544
- Sandia Corp., Albuquerque, N. Mex.**
Sol-gel protective coatings for black chrome solar selective films [DE82-004138] p 74 N83-15942
- Sandia Labs., Albuquerque, N. Mex.**
Proceedings of a Symposium on High Energy Density Capacitors and Dielectric Materials [PB82-197344] p 160 N83-10373
Central-station applications System and subsystem research activities p 40 N83-10511
Results of testing a development module of the second-generation E-systems concentrating photovoltaic-thermal module [DE82-015671] p 46 N83-10598
Aeroelastic stability analysis of a Darneus wind turbine [DE82-017001] p 121 N83-10603
Solar hemispherical reflectometer modification for second-surface mirror measurement [DE82-016913] p 47 N83-10610
Efficiency-improvement study for GaAs solar cells [DE82-016410] p 48 N83-11585
Intermediate photovoltaic system application experiment operational performance report. Volume 3 Beverly High School, Beverly, Massachusetts [DE82-006236] p 50 N83-12543
Fusion Energy Division automation of the ISX-B neutral beams [DE82-016369] p 132 N83-13008
Contact stresses on a thin plate after large displacements to a full parabolic surface [DE82-005712] p 55 N83-13504
Intermediate photovoltaic system application experiment operational performance report for CDC Light Manufacturing Building, San Bernardino, California [DE82-020883] p 56 N83-13599
Forced vibration analysis of rotating structures with application to vertical axis wind turbines [DE82-000620] p 133 N83-13625
Beam and deposition stability in light-ion fusion targets [DE82-017768] p 134 N83-13993
Structural-dynamic-response characteristics of Darneus vertical axis wind turbines [DE82-003583] p 135 N83-14545
Distributed photovoltaic systems Utility interface issues and their present status Intermediate/three-phase systems [NASA-CR-169664] p 61 N83-14686

- The 17-M VAWT program [DE82-003497] p 137 N83-14756
Parametric behavior of the circulating zinc-bromine battery [DE82-001910] p 167 N83-14759
Aerodynamics and performance testing of the VAWT [DE82-003574] p 137 N83-14760
Development effort of Sheet Molding Compound (SMC) parabolic trough panels [DE82-000841] p 67 N83-14761
Pulsed power for inertial-confinement fusion [DE82-001991] p 137 N83-15116
Particle-beam fusion [DE82-003107] p 138 N83-15118
Transport of light-ion beams in plasma channels [DE82-001649] p 139 N83-15140
Deuterium flux measurements in the edge plasmas of PLT and PDX during auxiliary heating experiments [DE82-001909] p 139 N83-15143
Effects of solvent composition and concentration on early liquefaction reactions [DE82-004136] p 109 N83-15395
Material properties of Green River oil shale [DE82-003271] p 111 N83-15801
Vertical axis wind turbine program p 147 N83-15913
Status report of the 17-m VAWT program p 148 N83-15931
Structural dynamic response characteristics of Darneus vertical axis wind turbines p 148 N83-15932
Aerodynamics and performance testing of the VAWT p 149 N83-15933
Oil-shale program [DE82-900588] p 111 N83-15951
Lifetime and effective surface recombination velocity measurements in high-efficiency Si solar cells [DE81-030361] p 74 N83-15953
Vertical-axis wind-turbine program [DE82-003531] p 150 N83-15954
- Sandia Labs., Livermore, Calif.**
Designing the manifold piping for parabolic-trough-collector fields [DE82-015998] p 46 N83-10599
Solar cogeneration [DE82-019085] p 57 N83-13604
- Sargent and Lundy, Engineers, Chicago, Ill.**
Compressed-air energy storage preliminary design and site-development program in an aquifer Volume 1 Executive summary [DE82-019284] p 164 N83-13610
- Schaefer (Arnold) G.m.b.H., Saarwellingen (West Germany).**
Dry processing of power plant coal nch in inerts [BMFT-FB-T-82-101] p 90 N83-10631
- Schmidt Reuter Engineering Consulting Co., Cologne (West Germany).**
Conserving energy by improving the quality of the air purifying and air conditioning systems [BMFT-FB-T-82-067] p 6 N83-10651
- Schott Glaswerke, Mainz (West Germany).**
Development of large scale production methods for components of solar energy collection Transparent glass covers and their connection to the collector system [BMFT-FB-T-82-083] p 47 N83-10622
Flat plate solar collectors [BMFT-FB-T-82-139] p 68 N83-14764
- Science Applications, Inc., Boulder, Colo.**
Instabilities driven by the parallel variation of the electrostatic potential in tandem [DE82-018409] p 126 N83-10941
Reduction of neoclassical losses in magnetic-confinement devices [DE82-020277] p 132 N83-13003
Radial guiding-center drifts and omnigenity in bumpy-torus confinement systems [DE82-019802] p 135 N83-14000
- Science Applications, Inc., La Jolla, Calif.**
Cogeneration Energy Systems assessment. Volume 2 Technical discussion [PB82-200692] p 8 N83-11609
- Science Applications, Inc., Palo Alto, Calif.**
Computer-simulation code for the prediction of reliability and available capacity of modular energy-storage arrays Volume 1 Overview [DE82-906445] p 164 N83-13618
- Science Research Council, Chilton (England).**
Heat Storage and Heat Pumps [PB82-226481] p 163 N83-13415
- Scott Paper Co., Chester, Pa.**
Demonstration of synergistic industrial energy/municipal solid waste disposal facility [DE82-001145] p 99 N83-13041
- Secord (Nelson W.), Brighton, Mich.**
WECS-load controlled pitch-variable load conversion to heat [DE82-014683] p 121 N83-10602

- Selfec, Cleveland, Ohio.**
Potential role and technology status of closed-cycle MHD for light-weight nuclear space-power systems p 142 N83-15853
- Semix, Inc., Gaithersburg, Md.**
Large-area silicon sheet task p 41 N83-10520
- Siemens A.G., Berlin (West Germany).**
Fundamental research into high voltages for further development of electric power distribution systems [BMFT-FB-T-82-064] p 157 N83-10368
- Societe Anonyme Belge de Constructions Aeronautiques, Brussels (Belgium).**
Aging of small cryogenic heat pipes [SABCA-JPM/LN/H05/N28] p 159 N83-13248
- Societe Europeenne de Propulsion, Vernon (France).**
Development and testing of a spacecraft surface potential monitor p 65 N83-14718
- Societe Nationale Industrielle Aerospatiale, Cannes (France).**
TV-SAT solar array p 64 N83-14714
ARABSAT solar array p 66 N83-14733
- Solar Energetics, Inc., Wilmington, Del.**
Geothermal energy market study on the Atlantic Coastal Plain Dover Air Force Base geothermal energy evaluation [PB82-183997] p 91 N83-10643
- Solar Steam, Inc., Fox Island, Wash.**
An economic evaluation of solar energy p 45 N83-10549
- Solar Turbines International, San Diego, Calif.**
Combustion characteristics of hydrogen-carbon monoxide based gaseous fuels p 78 A83-11491
- Solarelectronics, Inc., Bellingham, Mass.**
Flat-plate collector research area Silicon material task p 41 N83-10519
Investigation of the hydrochlorination of SiC4 [NASA-CR-169621] p 58 N83-14668
Investigation of the hydrochlorination of SiCL4 [NASA-CR-169622] p 60 N83-14682
- Solarex Corp., Rockville, Md.**
Cell and module formation research area p 41 N83-10522
- Southampton Univ. (England).**
Electron and photon degradation of boron doped FZ silicon solar cells p 64 N83-14711
- Southern Research Inst., Birmingham, Ala.**
Sampling for high-molecular-weight organic compounds in power plant stack gases [PB82-234618] p 16 N83-13659
- Southwest Research Inst., San Antonio, Tex.**
Tests of blending and correlation of distillate fuel properties p 78 A83-11050
Characterization of diesel emissions from operation of a light-duty diesel engine on alternate source diesel fuels [PB82-232448] p 101 N83-13281
Characterization of diesel emissions from operation of a light-duty diesel vehicle on alternate source diesel fuels [PB82-234147] p 101 N83-13282
Installation of a diesel engine combustion/ignition evaluation facility [AD-A119610] p 104 N83-14189
Assessment/review of methanol technology and utilization as a fuel [AD-A120109] p 109 N83-15489
- Spectrolab, Inc., Sylmar, Calif.**
PV history Lessons for the future p 40 N83-10514
Environmental isolation task p 41 N83-10521
Cell and module formation research area p 41 N83-10522
Thin cell development and testing p 62 N83-14702
- Spectron Development Labs., Inc., Costa Mesa, Calif.**
Particulate processes in pulverized coal flames [DE82-003370] p 76 N83-14204
- Spire Corp., Bedford, Mass.**
Cell and module formation research area p 41 N83-10522
Large area space solar cell assemblies p 68 N83-15810
Applications of materials surface modification to prime power systems p 144 N83-15878
- Springborn Labs., Inc., Enfield, Conn.**
Environmental isolation task p 41 N83-10521
Investigation of test methods, material properties and processes for solar cell encapsulants [NASA-CR-169636] p 60 N83-14676
- Stadtwerke Duisberg A.G. (West Germany).**
Steam generation with circulating atmospheric fluidized bed combustion [BMFT-FB-T-82-134] p 94 N83-11596
- Stanford Univ., Calif.**
Electrolytic deposition of low-cost, high-purity polysilicon suitable for use in solar-cell devices [DE82-012428] p 51 N83-12552

Pulverized coal combustion
[DE82-002969] p 105 N83-14198
MHD generator research at Stanford p 142 N83-15854

State Coll. of Mining and Metallurgy, Ostaua-Poruba (Czechoslovakia)
Electron impact ionization of highly charged molybdenum impurities in Tokamak plasmas p 151 N83-16119

State Planning Council on Radioactive Waste Management, Washington, D.C.
Recommendation on national radioactive waste management policies [DE81-029916] p 17 N83-13972

State Univ. of New York at Buffalo, Amherst
Investigation of power processing technology for spacecraft applications [AD-A119644] p 135 N83-14151

State Univ. of New York, Buffalo.
Role of tin catalysts in the hydrolyzation of coal p 81 N83-10131
External ionization mechanisms for advanced thermionic converters p 120 N83-10496
Thermodynamics and photoelectrochemical behavior of the n-TiO₂ electrode in fluoride containing solutions [AD-A119144] p 58 N83-14179

Stockholm Univ (Sweden).
Some comments on the World Energy Conference (WEC) energy demand model [USIP-82-04] p 15 N83-13628

Stuttgart Univ (West Germany).
Static and dynamic analysis for hinged rotor blades of 60 m span for a two bladed horizontal axis wind energy converter p 130 N83-12535

Suntech, Inc., Marcus Hook, Pa.
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil Part 4 Production of samples of military fuels from raw shale oils [AD-A117526] p 83 N83-10211

Swedish Council for Building Research, Stockholm.
Durability of solar collectors Experience from surveys of Swedish solar collector installations, 1979 - 1980 [PB82-188095] p 49 N83-11605
Thermochemical heat storage State-of-the-art report [PB82-188087] p 162 N83-11610
Seasonal thermal storage Swedish practice, developments and cost projections [PB82-232331] p 165 N83-13635

Sydney Univ. (Australia).
Experiments with a twin rotor, single bladed gyromill p 150 N83-15941

Systech Corp., Xenia, Ohio.
Conversion of municipal solid waste to energy, Jacksonville, Florida p 5 N83-10593

Systems Applications, Inc., San Rafael, Calif.
Evaluation of short-term NO₂ plume models for point sources Volume 1 Technical discussion [PB82-234329] p 16 N83-13658

SCS Engineers, Covington, Ky
Demonstration of landfill gas enhancement techniques in landfill simulators p 88 N83-10594

STD Research Corp., Arcadia, Calif
Self-excited MHD power source for space applications p 141 N83-15849

T

Technical Research Centre of Finland, Espoo.
A thermal desorption cold-trap unit for gaschromatographic analysis of gaseous organic pollutants [PB82-206368] p 3 N83-10152

Technical Univ. of Denmark, Lyngby.
Users experience in Denmark Developments, achievements and experience of the Danish activities in wind energy utilization, 1974 - 1981 p 10 N83-12536

Technical Univ. of Prague (Czechoslovakia).
Ion velocity measurements for laser mass ablation studies p 152 N83-16128

Technical Univ. of Zamek (Czechoslovakia).
Development of current sheath on output of coaxial gun p 152 N83-16125

Technische Hochschule, Aachen (West Germany).
Desulfurization of coal by means of the Batac-jig [BMFT-FB-T-82-100] p 82 N83-10145
Pressure-swinging underground gasification Theoretical and experimental investigations of gasification, phase 2 [BMFT-FB-T-82-066] p 89 N83-10615

Technische Hochschule, Darmstadt (West Germany).
Determination of climatological parameters of global radiation and direct solar radiation for horizontal, not horizontal, fixed and normal incident radiation absorber [BMFT-FB-T-82-070] p 48 N83-10718

Technische Hogeschool, Delft (Netherlands).
Aerodynamic research on tipvane wind turbines [VTH-LR-355] p 128 N83-11603

Technische Hogeschool, Eindhoven (Netherlands).
Effect of radiation and non-Maxwellian electron distribution on relaxation processes in an atmospheric cesium seeded argon plasma [EUT-82-E-124] p 140 N83-15144

Technische Univ., Berlin (West Germany)
Investigation of extracts by fluidized bed extraction [BMFT-FB-T-82-068] p 81 N83-10142

Technische Universitaet, Brunswick (West Germany)
Computerized simulation of the dynamic response of a coal-fired power plant with pressurized fluidized bed [BMFT-FB-T-82-094] p 90 N83-10629
Optimization of silicon solar cells for solar generators with concentration p 63 N83-14707

Technische Universitaet, Clausthal-Zellerfeld (West Germany)

Development of new and improvement of existing core recovery methods [BMFT-FB-T-82-091] p 91 N83-10705
Improvement of the casing cementation of deep and ultradeep wells Part 1 Drilling muds and washing fluids [BMFT-FB-T-82-111-PT-1] p 92 N83-11364
Improvement of casing cementation of deep and ultradeep wells Part 2 Oilfield cements and cement additives [BMFT-FB-T-82-112-PT-2] p 93 N83-11365

Teknekron, Inc., Berkeley, Calif.
Harnessing the Sun for development Actions for consideration by the international community at the UN Conference on New and Renewable Sources of Energy for promoting the use of renewable energy in developing countries [DE82-020273] p 52 N83-12558

Teledyne Energy Systems, Timonium, Md.
Advanced alkaline electrolysis cell development Development of electrolysis operation cell separator for 1250C [DE82-020697] p 76 N83-13593

Tennessee Univ. Space Inst., Tullahoma
Three-dimensional current distribution in coal-fired MHD channels [DE82-016958] p 99 N83-13005

Tennessee Valley Authority, Muscle Shoals, Ala.
Biomass fuels update TVAs biomass fuels program [DE82-904990] p 89 N83-10613

Tetra Tech, Inc., Pasadena, Calif.
Technical and economical assessment on Tethered Wind-Energy Systems (TWES) [DE82-017120] p 121 N83-10604

Texas A&M Univ., College Station.
Metal chelate catalysts for fuel cells [PB82-195637] p 131 N83-12592

Texas Engineering Experiment Station, College Station.
Basic Research Opportunities for Lasting Fuel Gas Supplies from Inorganic Resources Report of a Workshop College Station, 8 Jun - 14 Aug 1981 [PB82-231671] p 101 N83-13284

Texas Univ., Arlington
Transient flow analysis of the AEDC/HPDE MHD generator [AIAA PAPER 83-0395] p 117 A83-16691

Texas Univ., Austin.
Geologic studies of geopressured and hydrogeopressured zones in Texas Test well site selection [PB82-220542] p 94 N83-11653

A multi-site magnetotelluric measurement system with real-time data analysis [DE82-020596] p 98 N83-12704
Stabilization of axisymmetric mirror plasma by energetic ion injections [DE81-030341] p 155 N83-16229

Texas Univ., El Paso.
A groundwater convection model for Rio Grande rift geothermal resources p 79 A83-11831

Thermacore, Inc., Lancaster, Pa
The need for improved heat pipe fluids p 159 N83-15892

Enhanced heat pipe theory and operation p 145 N83-15893

Thermo Electron Corp., Waltham, Mass.
Thermionic technology for spacecraft power Progress and problems p 145 N83-15887

Thorn EMI, Hayes (England).
Electrophoretic Cds/Cu₂S solar cells for space applications p 63 N83-14704

Tokyo Gas Co Ltd. (Japan).
Thermal analysis of the position of the freezing front around an LNG in-ground storage tank with a heat barrier p 110 N83-15712

Total Environmental Action, Inc., Harrisville, N.H.
Study of photovoltaic residential retrofits Volume 1 Executive summary [DE82-015793] p 46 N83-10605
Design and fabrication of a prototype system for photovoltaic residences in the Southwest [DE82-020783] p 51 N83-12554

Toulouse Univ. (France).
The reduction of radiation damage in solar cells A study of radiation defects in silicon, first phase [CESR-81-985] p 57 N83-13626

Trinity Univ., San Antonio, Tex.
Development of the trickle roof cooling and heating system Experimental plan [DE82-019082] p 57 N83-13615

TriSolar Corp., Bedford, Mass.
Study of photovoltaic residential retrofits Volume 2 Main report [DE82-015626] p 53 N83-12566

Trochoid Power Corp., Eden Prairie, Minn.
Positive displacement rotary vapor compressor for vapor compression [PB82-227620] p 3 N83-10429

TEA, Inc., Harrisville, N.H.
Study of photovoltaic residential retrofits Volume 2 Main report [DE82-015626] p 53 N83-12566

TRW Defense and Space Systems Group, Redondo Beach, Calif.
Miniaturized Cassegrainian concentrator concept demonstration p 71 N83-15830

TRW Space Technology Labs., Redondo Beach, Calif
Ultralightweight solar array technology p 66 N83-14729

TRW, Inc., Redondo Beach, Calif.
Optimal sun-alignment techniques of large solar arrays in electric propulsion spacecraft [AIAA PAPER 82-1898] p 25 A83-12475
Deep discharge reconditioning and shorted storage of batteries [NASA-CR-167953] p 120 N83-10502
A compendium of synfuel end use testing programs [PB82-236936] p 100 N83-13279

U

Underwriters Labs., Inc., New York.
Development of photovoltaic array and module safety requirements [NASA-CR-169641] p 60 N83-14681

Union Carbide Corp., Tonawanda, N.Y.
Flat-plate collector research area Silicon material task p 41 N83-10519

United Engineers and Constructors, Inc., Philadelphia, Pa
Preliminary design study of compressed-air energy storage in a salt dome Volume 4 CAES turbomachinery design [DE82-019781] p 162 N83-12561

United Kingdom Atomic Energy Authority, Harwell (England)
Secondary battery requirements for space use in the late 1980's 1990's [HL82/1200] p 165 N83-13627

United Technologies Corp., East Hartford, Conn.
Alkaline fuel cells for prime power and energy storage p 167 N83-15845

United Technologies Corp., South Windsor, Conn.
Combustion of coal gas fuels in a staged combustor [NASA-TM-82987] p 85 N83-10556
On the 40kW test power plant modification and development, phase 2 [PB82-216102] p 122 N83-10637

United Technologies Research Center, East Hartford, Conn.
Combustion of coal gas fuels in a staged combustor [NASA-TM-82987] p 85 N83-10556
Reaction-induced temperature deviations during coal devolatilization in a heated grid [DE82-003864] p 106 N83-14300

DOE/UTRC kW development program p 74 N83-15924

University of Southern California, Los Angeles.
Optical absorption coefficient and minority carrier diffusion length measurements in low-cost silicon solar cell material p 30 A83-13922

Utah State Univ., Logan.
A computer simulation model of salt-gradient solar ponds p 55 N83-13580

Utah Univ., Salt Lake City.
A carbon-13 and proton nuclear magnetic resonance study of some experimental referee broadened-specification /ERBS/ turbine fuels p 78 A83-11482

Catalytic hydrodeoxygenation of coal-derived liquids and related oxygen-containing compounds

p 81 N83-10132

V

Varian Associates, Palo Alto, Calif.

Progress toward cascade cells made by OM-VPE

p 69 N83-15813

Vereinigte Elektrizitätswerke Westfalen A.G., Dortmund (West Germany).

Determination of friction coefficients on several distant heat pipe sections with different sliding partners [BMFT-FB-T-82-095]

p 158 N83-10397

Basic engineering of a 10 t/hr prototype plant for the Vereinigte Elektrizitätswerke Westfalen (VEW) coal conversion process [BMFT-FB-T-82-114]

p 101 N83-13378

Vereinigte Kesselwerke Duesseldorf (West Germany).

Technical study on the possibilities of oil shale combustion in a fluidized bed furnace including cost estimates for a plant to be built [BMFT-FB-T-82-085]

p 90 N83-10623

Virginia Polytechnic Inst. and State Univ., Blacksburg.

Microbiological studies towards optimization of methane from manure plant biomass [PB82-214362]

p 92 N83-10756

Analytical and experimental analysis of procedures for testing solar domestic hot water systems [PB82-184839]

p 49 N83-12287

Gust structure analysis for WECS Design and performance analysis [DE82-005321]

p 137 N83-14746

Virginia Univ., Charlottesville.

Wind power assessment along the Atlantic and Gulf Coasts of the United States

p 108 N83-14816

Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).

Wind Energy Conversion Devices

[VKI-LS-1981-8] p 130 N83-12526

W

Washington State Energy Office, Olympia

Passive solar energy in Washington Results of the Washington passive solar design/build/competition [DE82-020394]

p 51 N83-12549

Guide to a geothermal heat plan A geothermal energy application, serial no 3 [DE82-020591]

p 13 N83-13598

Washington Univ., St. Louis, Mo.

Atmospheric testing of a two bladed full controlled wind turbine with passive cyclic pitch variation

p 149 N83-15938

Waste Management, Inc., Pompano Beach, Fla.

Solid waste to methane gas (ReiCOM)

p 88 N83-10584

Wayne State Univ., Detroit, Mich

Sensitivities of internal combustion automotive engines to variations in fuel properties [PB82-194961]

p 84 N83-10430

West Texas State Univ., Canyon

Agricultural application of SWECS

p 111 N83-15923

Westinghouse Electric Corp., Concordville, Pa

NOx results from two combustors tested on medium BTU coal gas

p 78 A83-11493

Compressed-air energy storage preliminary design and site-development program in an aquifer Volume 1 Executive summary [DE82-019284]

p 164 N83-13610

Westinghouse Electric Corp., Madison, Pa

Applications of a high temperature radiation resistant electrical insulation

p 144 N83-15874

Westinghouse Electric Corp., Pittsburgh, Pa.

NOx results from two combustors tested on medium BTU coal gas

p 78 A83-11493

Large-area silicon sheet task

p 41 N83-10520

Cell and module formation research area

p 41 N83-10522

Cell module and fuel conditioner development [NASA-CR-165462-A]

p 130 N83-12524

Research, development and demonstration of nickel-iron batteries for electric-vehicle propulsion [DE82-021216]

p 163 N83-12582

Low cost solar array project cell and module formation research area Process research of non-CZ silicon material [NASA-CR-169632]

p 59 N83-14671

Gas cooled reactors for large space power needs

p 142 N83-15858

Westinghouse Research and Development Center, Pittsburgh, Pa.

Large-area sheet task advanced dendritic web growth development

[NASA-CR-169624] p 58 N83-14665

Large-area sheet task advanced dendritic web growth development

[NASA-CR-169639] p 59 N83-14669

Large-area sheet task advanced dendritic web growth development

[NASA-CR-169637] p 59 N83-14675

Materials for high power MHD systems

p 144 N83-15872

Weston (Roy F.), Inc., West Chester, Pa.

Demonstration of synergistic industrial energy/municipal solid waste disposal facility

[DE82-001145] p 99 N83-13041

Technology assessment of solar thermal energy applications in wastewater treatment

[PB82-229790] p 58 N83-13672

Wichita State Univ., Kans.

Airfoil data for wind turbines

p 130 N83-12531

Control systems for horizontal-axis wind turbines

p 130 N83-12532

Users manual for WIND

p 130 N83-12534

Wisconsin Univ., Madison.

Protection of large capacitor banks

[DE82-017353] p 120 N83-10366

Alcohol as a fuel for farm and construction equipment [DE82-021022]

p 100 N83-13277

Poloidal ohmic heating in a multipole [DE82-019888]

p 134 N83-13998

Diesel combustion analysis using rapid sampling techniques [AD-A119658]

p 104 N83-14192

Fusion materials Adapting to realistic reactor environments

[DE82-002708] p 138 N83-15132

Conceptual design for a modular-stellarator fusion-reactor magnet

p 138 N83-15135

World Meteorological Organization, Geneva (Switzerland).

Technical Conference on Climate Africa

[WMO-596] p 170 N83-12736

Wynholds (Hans W.) Co., Cupertino, Calif

Safety data for small wind systems

[DE82-015400] p 131 N83-12565

Wyoming Univ., Laramie.

Data collection and analysis for geothermal research [PB82-185430]

p 97 N83-12390

WED Enterprises, Glendale, Calif.

Water hyacinth wastewater treatment system

p 88 N83-10586

WTG Energy Systems, Inc., Buffalo, N.Y

Operational experience on MP-200 series commercial wind turbine generators

p 147 N83-15917

Y

Yale Univ., New Haven, Conn.

Development of newer methods for the isolation and identification of certain components found in complex mixtures derived from energy sources and the determination of their toxicity via bioassay systems [DE82-019043]

p 81 N83-10140

APRIL 1983

DE-AI01-77ET-10350

DE-AI01-77ET-10769

DE-AI01-77ET-13111

DE-AI01-79ER-10035

DE-AI01-79ET-20307

DE-AI01-79ET-20485

DE-AI01-79ET-27025

DE-AI01-80ET-17088

DE-AI01-81CS-50006

DE-AI01-82ET-20342

DE-AI04-80AL-12726

DE-AI07-76ET-20320

DE-AI21-80-MC14004

DE-AL01-79ET-27025

DE-AM03-76ER-70067

DE-AM04-80AL-13137

DE-AS02-76ET-52040

DE-AS02-76ET-52042

DE-AS02-77EV-04204

DE-AS02-78ET-52048

DE-AS05-77ET-28341

DE-AS05-78ET-52025

DE-AT03-76ET-51011

DE-AT03-79ET-15391

DE-AT03-80SF-11458

DE-AT04-81AL-16228

DE-FC03-77CS-31501

DE-FC03-79ET-27133

DE-FG01-79CS-20234

DE-FG01-79CS-20245

DE-FG01-80RA-50299

DE-FG02-79ER-10543

DE-FG02-80CS-83113

DE-FG02-81R-510301

DE-FG02-81R-510309

DE-FG05-80ET-53088

DE-FG06-79ET-17156

DE-FG06-79ET-27256

DE-FG06-79RO-00003

DE-FG07-79RO-00079

DE-FG07-80RA-50329

DE-FG22-80PC-30305

DE-FG22-81PC-40285

DE-FG51-79RO-00079

DE-FM02-82FE-55014

DEN3-131

DEN3-145

DEN3-149

DEN3-161

DEN3-167

DEN3-168

DEN3-180

DEN3-212

DEN3-241

DEN3-32

DEN3-59

DEN3-60

DEN3-64

DE82-01968

DI-AA851-CT0-56

DOE-ET-78-C-01-3431

DOE-78-04-4226

DOT-FA79WA-4184

DOT-RS57-80-C-00103

DT-FA01-81-Y-10534

DTFA03-80-A-00215

DTRS-57-80-P-80733

E(11-1)-2588

E(49-18)-2555

EC-77-A-31-10040

EC-77-A-31-1011

EDA-06-05-11007-10

EE-77-S-02-4346

p 120 N83-10349

p 133 N83-13359

p 169 N83-16257

p 83 N83-10208

p 102 N83-13588

p 133 N83-13589

p 85 N83-10556

p 85 N83-10557

p 86 N83-10559

p 76 N83-10560

p 2 A83-14517

p 55 N83-13581

p 55 N83-13582

p 56 N83-13585

p 73 N83-15840

p 91 N83-10640

p 91 N83-10643

p 130 N83-12524

p 140 N83-15839

p 96 N83-12250

p 100 N83-13272

p 122 N83-10639

p 166 N83-14683

p 136 N83-14688

p 95 N83-12207

p 6 N83-10636

p 51 N83-12552

p 4 N83-10551

p 55 N83-13581

p 55 N83-13582

p 137 N83-15110

p 123 N83-10880

p 11 N83-12659

p 138 N83-15132

p 138 N83-15135

p 98 N83-12704

p 126 N83-10951

p 123 N83-10908

p 155 N83-16231

p 14 N83-13614

p 107 N83-14658

p 107 N83-14661

p 42 N83-10525

p 57 N83-13616

p 10 N83-12544

p 19 N83-14753

p 99 N83-13041

p 10 N83-12542

p 118 A83-17149

p 33 A83-15488

p 99 N83-12788

p 121 N83-10602

p 155 N83-16229

p 5 N83-10600

p 89 N83-10611

p 93 N83-11587

p 51 N83-12549

p 13 N83-13598

p 14 N83-13617

p 21 N83-15401

p 106 N83-14299

p 13 N83-13598

p 103 N83-13605

p 128 N83-11579

p 78 A83-11491

p 85 N83-10556

p 130 N83-12524

p 128 N83-12088

p 132 N83-13038

p 129 N83-12431

p 56 N83-13585

p 121 N83-10561

p 140 N83-15839

p 127 N83-10991

p 140 N83-15176

p 140 N83-15177

p 120 N83-10349

p 169 N83-16257

p 119 N83-10348

p 129 N83-12439

p 9 N83-11631

p 9 N83-11632

p 165 N83-13634

p 34 A83-15497

p 1 A83-10186

p 1 A83-10186

p 99 N83-13089

p 96 N83-12248

p 84 N83-10430

p 28 A83-13583

p 121 N83-10601

p 140 N83-15176

p 140 N83-15177

p 127 N83-11063

p 6 N83-10642

p 38 A83-18563

EEC-153-77-9ESB

EG-77-C-01-4042

EG-77-C-01-4047

EG-77-C-06-1021

ENEL-39/600

EPA-R-806709

EPA-68-01-6188

EPA-68-02-2153

EPA-68-02-2160

EPA-68-02-2272

EPA-68-02-2412

EPA-68-02-2646

EPA-68-02-2667

EPA-68-02-2775

EPA-68-02-3171

EPA-68-02-3174

EPA-68-03-2487

EPA-68-03-2775

EPA-68-03-2787

EPA-68-03-2884

EPRI PROJ 1081-1

EPRI PROJ 1081-2

EPRI PROJ 1081-3

EPRI PROJ 1211-2

EPRI PROJ 1940-1

EPRI PROJ 1975-2

EPRI PROJ 370-17

EPRI PROJ 635-2

EPRI PROJ 789-1

ESTEC-4404/80/NL-JS(SC)

ESTEC-4510/80/NL-JS(SC)

ET-78-A-03-2042

ET-78-C-01-2159

ET-78-C-01-3084

EX-76-A-36-1008

EX-76-C-01-2243

EY-76-S-02-2780

FA-03-80-A-00215

F04704-78-C-0001

F33615-78-C-2019

F33615-78-C-2024

F33615-78-C-2080

F33615-79-C-2079

F33615-80-D-4000

F33615-81-C-2011

F44620-76-C-0061

F49260-82-C-0008

F49620-82-C-0008

GEN ATOMIC PROJ 3344

GRI-5011-321-0125

GRI-5014-341-0112

GRI-5014-342-0185

GRI-5014-352-0203

GRI-5014-361-0242

GRI-5014-363-0174

GRI-5014-363-0198

GRI-5041-344-0192

GRI-5080-321-0301

GRI-5080-342-0389

GRI-5080-342-0394

GRI-5080-361-0368

GRI-5080-363-0306

GRI-5081-310-0507

GRI-5081-344-0430

GRI-5081-360-0435

GRI-5081-360-0453

HDL PROJ A18147

JPL PROJ 5101-216

JPL PROJ 5106-23

JPL PROJ 6072 1

JPL-954527

JPL-954929

JPL-955048

JPL-955392

JPL-955533

JPL-955612

JPL-955676

JPL-955843

JPL-955875

JPL-955909

p 62 N83-14701

p 121 N83-10601

p 121 N83-10604

p 53 N83-12567

p 54 N83-12587

p 54 N83-12588

p 133 N83-13714

p 21 N83-15915

p 149 N83-15934

p 149 N83-15936

p 29 A83-13699

p 118 A83-18457

p 103 N83-13629

p 107 N83-14495

p 7 N83-10665

p 98 N83-12667

p 16 N83-13665

p 16 N83-13659

p 16 N83-13657

p 103 N83-13673

p 93 N83-11377

p 101 N83-13280

p 16 N83-13658

p 12 N83-12668

p 16 N83-13664

p 100 N83-13279

p 101 N83-13283

p 58 N83-13672

p 17 N83-13666

p 101 N83-13281

p 101 N83-13282

p 164 N83-13607

p 162 N83-12561

p 164 N83-13610

p 164 N83-13611

p 14 N83-13619

p 10 N83-12559

p 57 N83-13622

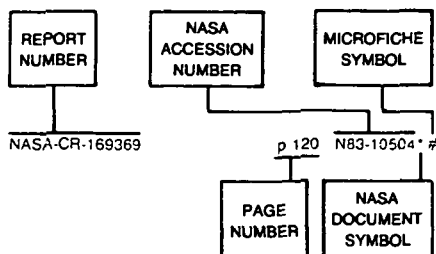
	p 4	N83-10585				p 119	N83-10135
	p 124	N83-10928				p 160	N83-10558
	p 125	N83-10940				p 167	N83-15372
	p 126	N83-10942	776-33-41	..	..	p 136	N83-14689
	p 126	N83-10943				p 136	N83-14690
	p 126	N83-10949	776-42-61	..	..	p 85	N83-10503
	p 127	N83-10953	776-52-41	..	..	p 73	N83-15840
	p 127	N83-10957	776-52-61	..	..	p 45	N83-10553
	p 10	N83-12559	776-72-41	..	..	p 166	N83-14683
	p 132	N83-13006	776-81-23	..	..	p 4	N83-10551
	p 132	N83-13008	776-81-62	..	..	p 42	N83-10525
	p 13	N83-13516	778-11-05	..	..	p 133	N83-13589
	p 102	N83-13552	778-11-06	..	..	p 102	N83-13588
	p 102	N83-13553	778-14-10	..	..	p 85	N83-10557
	p 102	N83-13554				p 86	N83-10559
	p 102	N83-13557				p 76	N83-10560
	p 102	N83-13558	778-18-12	..	..	p 136	N83-14691
	p 102	N83-13559	778-32-01	..	..	p 129	N83-12431
	p 103	N83-13650	778-35-03	..	..	p 127	N83-10991
	p 134	N83-13994	778-36-06	..	..	p 120	N83-10349
	p 135	N83-13999				p 133	N83-13359
	p 105	N83-14206				p 169	N83-16257
	p 18	N83-14302	778-38-12	..	..	p 96	N83-12250
	p 166	N83-14748	778-45-12	..	..	p 111	N83-15805
	p 20	N83-14778	778-46-22	..	..	p 121	N83-10568
	p 139	N83-15141					
	p 109	N83-15427					
	p 110	N83-15499					
	p 168	N83-15943					
	p 168	N83-15944					
	p 168	N83-15945					
	p 168	N83-15946					
	p 168	N83-15947					
	p 168	N83-15948					
	p 168	N83-15949					
	p 168	N83-15950					
	p 21	N83-15955					
	p 169	N83-15956					
	p 169	N83-15957					
	p 22	N83-16195					
	p 155	N83-16230					
	p 156	N83-16232					
	p 156	N83-16233					
W-7405-ENG-36	p 125	N83-10935					
	p 126	N83-10945					
	p 158	N83-12344					
	p 134	N83-13996					
	p 104	N83-14197					
	p 165	N83-14414					
	p 107	N83-14454					
	p 166	N83-14749					
	p 107	N83-14750					
	p 139	N83-15142					
	p 110	N83-15496					
	p 110	N83-15498					
	p 167	N83-15587					
	p 77	N83-15958					
	p 154	N83-16218					
	p 155	N83-16220					
	p 155	N83-16227					
	p 156	N83-16259					
W-7405-ENG-38	p 163	N83-12583					
W-7405-ENG-48	p 122	N83-10879					
	p 124	N83-10930					
	p 97	N83-12571					
	p 132	N83-13001					
	p 17	N83-13976					
	p 134	N83-13997					
	p 137	N83-14747					
	p 67	N83-14751					
	p 108	N83-14752					
	p 137	N83-15104					
	p 137	N83-15111					
	p 138	N83-15117					
	p 138	N83-15133					
	p 138	N83-15134					
	p 139	N83-15136					
	p 139	N83-15139					
	p 112	N83-15952					
	p 22	N83-15960					
	p 155	N83-16228					
W-7405-ENG-82	p 86	N83-10570					
W-7405-ENG-92	p 102	N83-13601					
WR0240201 ..	p 104	N83-14165					
XE-1-1167-1 ..	p 118	A83-18457					
XP-9-8002-7 ..	p 34	A83-15499					
XS-9-8312-1 ..	p 160	A83-12055					
	p 36	A83-16946					
505-31-32 ..	p 77	N83-16153					
505-32-32 ..	p 83	N83-10207					
	p 83	N83-10208					
505-32-72 ..	p 92	N83-11340					
506-55-42 ..	p 45	N83-10554					
	p 45	N83-10555					
	p 48	N83-10962					
506-55-52 ..	p 119	N83-10134					

REPORT/ACCESSION NUMBER INDEX

ENERGY / A Continuing Bibliography (Issue 37)

APRIL 1983

Typical Report/Accession Number Index Listing



Listings in this index are arranged alphanumerically by report number. The page number indicates the actual page where the citation is located. The accession number denotes the number by which the citation is identified. An asterisk (*) indicates that the item is a NASA report. A pound sign (#) indicates that the item is available on microfiche.

AAAF PAPER NT 81-17 p 113 A83-11777 #

AD-A117511 p 83 N83-10210 #

AD-A117526 p 83 N83-10211 #

AD-A117736 p 121 N83-10569 #

AD-A117746 p 84 N83-10426 #

AD-A117962 p 128 N83-11504 #

AD-A117972 p 170 N83-11794 #

AD-A118022 p 93 N83-11583 #

AD-A118337 p 162 N83-11582 #

AD-A118696 p 131 N83-12537 #

AD-A118838 p 96 N83-12252 #

AD-A118887 p 140 N83-15841 #

AD-A118888 p 143 N83-15860 #

AD-A118898 p 19 N83-14739 #

AD-A118909 p 99 N83-13089 #

AD-A119065 p 107 N83-14495 #

AD-A119144 p 58 N83-14179 #

AD-A119150 p 166 N83-14743 #

AD-A119155 p 163 N83-13590 #

AD-A119243 p 135 N83-14156 #

AD-A119291 p 19 N83-14772 #

AD-A119297 p 166 N83-14742 #

AD-A119305 p 67 N83-14741 #

AD-A119320 p 106 N83-14306 #

AD-A119324 p 106 N83-14294 #

AD-A119374 p 163 N83-13592 #

AD-A119381 p 163 N83-13591 #

AD-A119389 p 136 N83-14740 #

AD-A119563 p 18 N83-14116 #

AD-A119610 p 104 N83-14189 #

AD-A119644 p 135 N83-14151 #

AD-A119658 p 104 N83-14192 #

AD-A119749 p 104 N83-14165 #

AD-A119773 p 108 N83-14877 #

AD-A119830 p 154 N83-16143 #

AD-A119916 p 92 N83-11350 #

AD-A119917 p 92 N83-11351 #

AD-A119993 p 73 N83-15899 #

AD-A120002 p 146 N83-15907 #

AD-A120012 p 74 N83-15906 #

AD-A120013 p 73 N83-15905 #

AD-A120014 p 73 N83-15904 #

AD-A120052 p 154 N83-16214 #

AD-A120079 p 146 N83-15903 #

AD-A120109 p 109 N83-15489 #

AD-A120160 p 112 N83-16212 #

AD-A120671 p 95 N83-12246* #

AD-A120814 p 73 N83-15902 #

AD-A120853 p 146 N83-15901 #

AD-A120858 p 146 N83-15900 #

AD-F500064 p 166 N83-14743 #

AERE-G-2225 p 112 N83-15959 #

AFESC/ESL-TR-81-58 p 107 N83-14495 #

AFESC/ESL-TR-81-59 p 93 N83-11583 #

AFLRL-152 p 104 N83-14189 #

AFLRL-161 p 109 N83-15489 #

AFOSR-82-0655TR-VOL-1 p 140 N83-15841 #

AFOSR-82-0656TR-VOL-2 p 143 N83-15860 #

AFOSR-82-0717TR p 135 N83-14156 #

AFWAL-TR-81-2056-PT-1 p 83 N83-10210 #

AFWAL-TR-81-2087-PT-4 p 83 N83-10211 #

AFWAL-TR-81-2137 p 163 N83-13592 #

AFWAL-TR-82-2005 p 121 N83-10569 #

AFWAL-TR-82-2015 p 96 N83-12252 #

AFWAL-TR-82-2054 p 135 N83-14151 #

AGARD-AR-181-VOL-1 p 92 N83-11350 #

AGARD-AR-181-VOL-2 p 92 N83-11351 #

AGESS-820210 p 82 N83-10154 #

AIAA PAPER 82-1881 p 114 A83-12466* #

AIAA PAPER 82-1898 p 25 A83-12475* #

AIAA PAPER 82-1951 p 75 A83-12508* #

AIAA PAPER 83-0092 p 2 A83-16516 #

AIAA PAPER 83-0158 p 35 A83-16562 #

AIAA PAPER 83-0317 p 157 A83-16647 #

AIAA PAPER 83-0318 p 157 A83-16648 #

AIAA PAPER 83-0319 p 157 A83-16649 #

AIAA PAPER 83-0338 p 117 A83-16664 #

AIAA PAPER 83-0394 p 117 A83-16690 #

AIAA PAPER 83-0395 p 117 A83-16691* #

AIAA PAPER 83-0464 p 117 A83-16732 #

AIAA PAPER 83-0465 p 118 A83-17928 #

AIAA PAPER 83-0467 p 118 A83-16734 #

AIAA PAPER 83-0468 p 118 A83-16735* #

AIAA PAPER 83-0469 p 80 A83-16736 #

AMC-31-3480(11) p 128 N83-12088* #

AMC-81-18266 p 119 N83-10348* #

ANL-82-50 p 158 N83-12387 #

ANL/CNSV/TM-95 p 5 N83-10612 #

ANL/CNSV/TM-96 p 87 N83-10578 #

ANL/FE-49628-TM04 p 96 N83-12254 #

ANL/FE-81-53 p 96 N83-12253 #

ANL/FPP/TM-150 p 125 N83-10938 #

ANL/FPP/TM-154 p 125 N83-10937 #

ANL/OEPM-81-14 p 163 N83-12582 #

ANL/OEPM-81-15 p 162 N83-11584 #

ANL/OEPM-82-3 p 163 N83-12583 #

ANL/SPG-18 p 164 N83-13609 #

ANX/EES-TM-171 p 13 N83-13465 #

AP-42-SUPPL-12 p 6 N83-10654 #

APR-3 p 134 N83-13974 #

AR-3 p 16 N83-13657 #

ARO-14251 3-EG p 104 N83-14192 #

ARO-15788 3-EG p 104 N83-14192 #

AR002777 p 84 N83-10426 #

ASME PAPER 82-HT-33 p 25 A83-12791* #

ASME PAPER 82-HT-52 p 26 A83-12799 #

ASME PAPER 82-HT-53 p 26 A83-12800 #

AV-FR-81/559-VOL-1 p 9 N83-11631 #

AV-FR-81/559-VOL-2 p 9 N83-11632 #

AVRADCOM-TR-82-C-1 p 127 N83-11063* #

B-204622 p 19 N83-14770 #

B-204637 p 18 N83-14664 #

B-207657 p 19 N83-14767 #

BCL-N-4007-1 p 159 N83-13310 #

BCL-N-4007-2 p 159 N83-13311 #

BLL-RISLEY-TR-4173(9091 9F) p 11 N83-12594 #

BLL-T5869/BG/MRS14614/82 p 85 N83-10495 #

BLM/YN/SR-81/08-VOL-2 p 9 N83-11632 #

BLM/YV/SR-81/07-VOL-1 p 9 N83-11631 #

BM-IC-8875 p 3 N83-10481 #

BM-RI-8588 p 119 N83-10159 #

BM-TPR-118 p 103 N83-13636 #

BMFT-FB-T-80-188 p 18 N83-14312 #

BMFT-FB-T-82-064 p 157 N83-10368 #

BMFT-FB-T-82-065 p 161 N83-10614 #

BMFT-FB-T-82-066 p 89 N83-10615 #

BMFT-FB-T-82-067 p 6 N83-10651 #

BMFT-FB-T-82-068 p 81 N83-10142 #

BMFT-FB-T-82-069 p 90 N83-10616 #

BMFT-FB-T-82-070 p 48 N83-10718 #

BMFT-FB-T-82-071 p 120 N83-10369 #

BMFT-FB-T-82-072 p 128 N83-11590 #

BMFT-FB-T-82-073 p 81 N83-10143 #

BMFT-FB-T-82-074 p 90 N83-10617 #

BMFT-FB-T-82-076-PT-1 p 5 N83-10618 #

BMFT-FB-T-82-077-PT-2 p 7 N83-11591 #

BMFT-FB-T-82-078 p 161 N83-10619 #

BMFT-FB-T-82-079 p 47 N83-10620 #

BMFT-FB-T-82-081 p 47 N83-10621 #

BMFT-FB-T-82-083 p 47 N83-10622 #

BMFT-FB-T-82-085 p 90 N83-10623 #

BMFT-FB-T-82-086 p 122 N83-10624 #

BMFT-FB-T-82-091 p 91 N83-10705 #

BMFT-FB-T-82-093 p 84 N83-10479 #

BMFT-FB-T-82-094 p 90 N83-10629 #

BMFT-FB-T-82-095 p 158 N83-10397 #

BMFT-FB-T-82-098 p 90 N83-10625 #

BMFT-FB-T-82-099 p 158 N83-10370 #

BMFT-FB-T-82-100 p 82 N83-10145 #

BMFT-FB-T-82-101 p 90 N83-10631 #

BMFT-FB-T-82-102 p 158 N83-10428 #

BMFT-FB-T-82-103 p 48 N83-10632 #

BMFT-FB-T-82-104 p 47 N83-10626 #

BMFT-FB-T-82-105 p 161 N83-10627 #

BMFT-FB-T-82-106 p 92 N83-10719 #

BMFT-FB-T-82-107 p 82 N83-10146 #

BMFT-FB-T-82-108 p 91 N83-10652 #

BMFT-FB-T-82-109 p 122 N83-10633 #

BMFT-FB-T-82-111-PT-1 p 92 N83-11364 #

BMFT-FB-T-82-112-PT-2 p 93 N83-11365 #

BMFT-FB-T-82-114 p 101 N83-13378 #

BMFT-FB-T-82-117 p 16 N83-13651 #

BMFT-FB-T-82-118 p 16 N83-13652 #

BMFT-FB-T-82-123 p 20 N83-14783 #

BMFT-FB-T-82-125 p 68 N83-14763 #

BMFT-FB-T-82-128 p 7 N83-11592 #

BMFT-FB-T-82-129 p 7 N83-11593 #

BMFT-FB-T-82-131 p 8 N83-11594 #

BMFT-FB-T-82-133 p 94 N83-11595 #

BMFT-FB-T-82-134 p 94 N83-11596 #

BMFT-FB-T-82-135 p 8 N83-11597 #

BMFT-FB-T-82-137 p 49 N83-11598 #

BMFT-FB-T-82-139 p 68 N83-14764 #

BMFT-FB-T-82-142 p 162 N83-11599 #

BMFT-FB-T-82-144 p 94 N83-11600 #

BMFT-FB-T-82-147 p 9 N83-11617 #

BMFT-FB-T-82-167 p 128 N83-11601 #

BMI-2907 p 102 N83-13601 #

BNL-30057 p 76 N83-14303 #

BNL-30289 p 105 N83-14202 #

BNL-51463 p 52 N83-12558 #

BNL-51563 p 15 N83-13647 #

BNL-51573 p 76 N83-13593 #

REPORT

BR-13058	p 121	N83-10569 #	CONF-811084-1	p 167	N83-14759 #	DE82-002598	p 111	N83-15803 #
			CONF-811087-13	p 139	N83-15139 #	DE82-002631	p 107	N83-14454 #
C-655	p 166	N83-14742 #	CONF-811087-5	p 155	N83-16227 #	DE82-002708	p 138	N83-15132 #
			CONF-811101-15	p 110	N83-15499 #	DE82-002710	p 137	N83-15110 #
CAEC-88	p 8	N83-11606 #	CONF-811110-2	p 68	N83-14762 #	DE82-002739	p 20	N83-14778 #
			CONF-811113-25	p 139	N83-15143 #	DE82-002758	p 52	N83-12560 #
CAES-590-81	p 96	N83-12250* #	CONF-811116-1-REV	p 104	N83-14197 #	DE82-002808	p 156	N83-16232 #
CAES-600-81	p 100	N83-13272* #	CONF-811122-6	p 21	N83-15113 #	DE82-002812	p 21	N83-15955 #
			CONF-811140-1	p 138	N83-15133 #	DE82-002829	p 155	N83-16222 #
CBIP-PUBL-150-VOL-1	p 122	N83-10634 #	CONF-811142-1	p 17	N83-13973 #	DE82-002831	p 154	N83-16217 #
CBIP-PUBL-150-VOL-2	p 122	N83-10635 #	CONF-811148-1	p 156	N83-16259 #	DE82-002863	p 138	N83-15135 #
			CONF-811207-1	p 74	N83-15953 #	DE82-002866	p 155	N83-16230 #
CDH-UW-R-81-11	p 97	N83-12390 #	CONF-811209-1	p 155	N83-16220 #	DE82-002879	p 156	N83-16233 #
			CONF-811212-3	p 110	N83-15498 #	DE82-002969	p 105	N83-14198 #
CEA-CONF-5721	p 104	N83-13975 #	CONF-811245	p 87	N83-10578 #	DE82-003011	p 164	N83-13609 #
			CONF-820103-1	p 67	N83-14761 #	DE82-003044	p 137	N83-15104 #
CERL-SR-E-179	p 73	N83-15899 #	CONF-820107-1	p 74	N83-15942 #	DE82-003061	p 109	N83-15402 #
			CONF-820345-10	p 132	N83-13007 #	DE82-003066	p 137	N83-15111 #
CERL-TM-P-133	p 170	N83-11794 #	CONF-820345-14	p 125	N83-10934 #	DE82-003069	p 138	N83-15117 #
			CONF-820345-8	p 125	N83-10933 #	DE82-003107	p 138	N83-15118 #
			CONF-820605-3	p 77	N83-15958 #	DE82-003145	p 17	N83-13973 #
CER81-82DEN-RNM1	p 12	N83-12665 #				DE82-003150	p 139	N83-15139 #
CER81-82KMK-RNM-DEN22	p 12	N83-12666 #	CONTRIB-79-435-D	p 131	N83-12564 #	DE82-003198	p 155	N83-16231 #
						DE82-003222	p 129	N83-12437 #
CESR-81-985	p 57	N83-13626 #	COO-2218-230	p 137	N83-15110 #	DE82-003253	p 108	N83-14775 #
			COO-2780/5	p 123	N83-10880 #	DE82-003268	p 21	N83-15401 #
CIRC-Z-120	p 109	N83-15495 #				DE82-003271	p 111	N83-15801 #
						DE82-003273	p 105	N83-14205 #
CISE-1738	p 17	N83-13977 #	CSIR-BRR-396	p 161	N83-11578 #	DE82-003291	p 20	N83-14776 #
CISE-1754	p 103	N83-13629 #				DE82-003322	p 138	N83-15133 #
CISE-1795	p 19	N83-14765 #	CSS-126	p 109	N83-15322 #	DE82-003329	p 108	N83-14752 #
						DE82-003369	p 105	N83-14207 #
CMR-81-16	p 51	N83-12552 #	CW-WR-76-020 98A	p 101	N83-13464 #	DE82-003370	p 76	N83-14204 #
						DE82-003375	p 105	N83-14206 #
CONF-791266	p 21	N83-15114 #	DDA-EDR-10327	p 129	N83-12431* #	DE82-003497	p 137	N83-14756 #
CONF-801119-5-REV-1	p 138	N83-15117 #				DE82-003531	p 150	N83-15954 #
CONF-810399-3	p 107	N83-14658 #	DELET-TR-79-0260-F	p 146	N83-15900 #	DE82-003574	p 137	N83-14760 #
CONF-810399-5	p 107	N83-14661 #	DELET-TR-81-0378-F	p 166	N83-14742 #	DE82-003583	p 135	N83-14545 #
CONF-8105119	p 109	N83-15495 #	DELET-TR-81-0381-F	p 131	N83-12537 #	DE82-003593	p 105	N83-14208 #
CONF-810517-2	p 104	N83-13975 #	DELET-TR-81-0420-2	p 146	N83-15907 #	DE82-003634	p 110	N83-15497 #
CONF-810813-14	p 103	N83-13650 #	DELET-TR-81-0420-3	p 146	N83-15901 #	DE82-003670	p 105	N83-14202 #
CONF-810814-10	p 105	N83-14202 #				DE82-003702	p 18	N83-14302 #
CONF-810838-2	p 22	N83-15960 #	DE81-028202	p 164	N83-13607 #	DE82-003831	p 166	N83-14754 #
CONF-810923-12	p 110	N83-15496 #	DE81-029916	p 17	N83-13972 #	DE82-003833	p 167	N83-14758 #
CONF-810940-11	p 168	N83-15946 #	DE81-030114	p 104	N83-14197 #	DE82-003835	p 20	N83-14781 #
CONF-810940-16	p 168	N83-15945 #	DE81-030341	p 155	N83-16229 #	DE82-003838	p 167	N83-14755 #
CONF-810940-21	p 168	N83-15950 #	DE81-030361	p 74	N83-15953 #	DE82-003864	p 106	N83-14300 #
CONF-810940-23	p 168	N83-15949 #	DE81-030805	p 168	N83-15943 #	DE82-003868	p 19	N83-14757 #
CONF-810940-24	p 168	N83-15948 #	DE81-032001	p 104	N83-13975 #	DE82-004036	p 96	N83-12253 #
CONF-810940-27	p 168	N83-15947 #	DE81-700732	p 109	N83-15495 #	DE82-004037	p 110	N83-15499 #
CONF-810940-28	p 76	N83-14303 #	DE81-904161	p 168	N83-15946 #	DE82-004114	p 109	N83-15395 #
CONF-810940-8	p 168	N83-15943 #	DE82-000063	p 168	N83-15947 #	DE82-004136	p 74	N83-15942 #
CONF-810940-9	p 168	N83-15944 #	DE82-000107	p 168	N83-15948 #	DE82-004153	p 108	N83-14795 #
CONF-810947-4-DRAFT	p 139	N83-15141 #	DE82-000108	p 168	N83-15945 #	DE82-004230	p 17	N83-13976 #
CONF-810949-2	p 107	N83-14454 #	DE82-000110	p 168	N83-15949 #	DE82-004271	p 94	N83-12199 #
CONF-810997-1	p 167	N83-14755 #	DE82-000161	p 168	N83-15950 #	DE82-004361	p 139	N83-15142 #
CONF-810997-2	p 166	N83-14754 #	DE82-000164	p 14	N83-13606 #	DE82-004365	p 156	N83-16259 #
CONF-810997-3	p 167	N83-14758 #	DE82-000168	p 133	N83-13625 #	DE82-004366	p 167	N83-15587 #
CONF-810999-1	p 109	N83-15395 #	DE82-000490	p 155	N83-16220 #	DE82-004373	p 110	N83-15498 #
CONF-811006-7	p 20	N83-14778 #	DE82-000620	p 107	N83-14750 #	DE82-005310	p 134	N83-13974 #
CONF-811006-8	p 21	N83-15955 #	DE82-000756	p 67	N83-14761 #	DE82-005321	p 137	N83-14746 #
CONF-811008-3	p 107	N83-14750 #	DE82-000759	p 138	N83-15134 #	DE82-005712	p 55	N83-13504 #
CONF-8110101-2	p 139	N83-15142 #	DE82-000841	p 169	N83-15957 #	DE82-006057	p 10	N83-12542 #
CONF-8110104-3	p 20	N83-14781 #	DE82-000845	p 139	N83-15136 #	DE82-006198	p 11	N83-12659 #
CONF-8110115-1	p 108	N83-14752 #	DE82-000888	p 99	N83-13041 #	DE82-006221	p 50	N83-12545 #
CONF-811028-7	p 155	N83-16230 #	DE82-001062	p 67	N83-14751 #	DE82-006236	p 50	N83-12543 #
CONF-811040-105	p 137	N83-15111 #	DE82-001145	p 109	N83-15427 #	DE82-007195	p 126	N83-10947 #
CONF-811040-114	p 138	N83-15135 #	DE82-001338	p 22	N83-16195 #	DE82-007247	p 10	N83-12559 #
CONF-811040-119	p 167	N83-15587 #	DE82-001441	p 100	N83-13240 #	DE82-007724	p 125	N83-10940 #
CONF-811040-34	p 139	N83-15140 #	DE82-001450	p 139	N83-15141 #	DE82-007930	p 19	N83-14745 #
CONF-811040-35	p 137	N83-15116 #	DE82-001464	p 103	N83-13650 #	DE82-008101	p 126	N83-10942 #
CONF-811040-50	p 154	N83-16218 #	DE82-001478	p 166	N83-14748 #	DE82-008146	p 127	N83-10957 #
CONF-811040-58	p 155	N83-16228 #	DE82-001488	p 169	N83-15956 #	DE82-008203	p 97	N83-12480 #
CONF-811040-70	p 166	N83-14749 #	DE82-001494	p 106	N83-14301 #	DE82-009384	p 124	N83-10932 #
CONF-811040-86	p 137	N83-15104 #	DE82-001501	p 112	N83-15952 #	DE82-009388	p 126	N83-10949 #
CONF-811040-88	p 155	N83-16231 #	DE82-001576	p 68	N83-14762 #	DE82-010174	p 13	N83-13594 #
CONF-811040-90	p 156	N83-16232 #	DE82-001598	p 139	N83-15140 #	DE82-011507	p 127	N83-10953 #
CONF-811040-93	p 156	N83-16233 #	DE82-001646	p 139	N83-15143 #	DE82-012361	p 124	N83-10930 #
CONF-811043-VOL-1	p 146	N83-15908 #	DE82-001649	p 167	N83-14759 #	DE82-012388	p 122	N83-10879 #
CONF-811043-10	p 135	N83-14545 #	DE82-001909	p 107	N83-14658 #	DE82-012428	p 51	N83-12552 #
CONF-811043-11	p 137	N83-14756 #	DE82-001910	p 107	N83-14661 #	DE82-012573	p 125	N83-10939 #
CONF-811043-12	p 150	N83-15954 #	DE82-001980	p 137	N83-15116 #	DE82-013226	p 132	N83-13007 #
CONF-811043-1	p 133	N83-13625 #	DE82-001981	p 20	N83-14774 #	DE82-013674	p 5	N83-10612 #
CONF-811043-9	p 137	N83-14760 #	DE82-001991	p 106	N83-14299 #	DE82-013712	p 125	N83-10938 #
CONF-811046-10	p 137	N83-15110 #	DE82-002088	p 76	N83-14303 #	DE82-013935	p 124	N83-10931 #
CONF-811046-11	p 138	N83-15132 #	DE82-002227	p 155	N83-16227 #	DE82-014130	p 134	N83-13996 #
CONF-811046-8	p 138	N83-15134 #	DE82-002232	p 165	N83-14414 #	DE82-014250	p 22	N83-16256 #
CONF-811051-1	p 139	N83-15136 #	DE82-002245	p 166	N83-14749 #	DE82-014337	p 87	N83-10578 #
CONF-811051-2	p 165	N83-14414 #	DE82-002329	p 154	N83-16218 #	DE82-014659	p 146	N83-15908 #
CONF-811053-1	p 67	N83-14751 #	DE82-002355	p 77	N83-15958 #	DE82-014683	p 121	N83-10602 #
CONF-811054-1	p 112	N83-15952 #	DE82-002385	p 110	N83-15496 #	DE82-014836	p 84	N83-10212 #
CONF-811056-1	p 22	N83-16195 #	DE82-002388	p 19	N83-14753 #	DE82-015099	p 89	N83-10611 #
CONF-811058-1	p 166	N83-14748 #	DE82-002390	p 111	N83-15802 #	DE82-015106	p 5	N83-10600 #
CONF-811061-1	p 100	N83-13240 #	DE82-002405	p 155	N83-16228 #	DE82-015108	p 93	N83-11587 #
CONF-811061-3	p 109	N83-15427 #	DE82-002539					
CONF-811066-1	p 169	N83-15956 #	DE82-002560					
CONF-811066-4	p 19	N83-14757 #	DE82-002594					

DE82-015206	p 123	N83-10880 #	DE82-020632	p 97	N83-12541 #	DOE/ET-20279/207	p 53	N83-12568 #
DE82-015400	p 131	N83-12565 #	DE82-020697	p 76	N83-13593 #	DOE/ET-20279/209	p 51	N83-12554 #
DE82-015476	p 47	N83-10608 #	DE82-020783	p 51	N83-12554 #	DOE/ET-20279/214	p 53	N83-12569 #
DE82-015626	p 53	N83-12566 #	DE82-020883	p 56	N83-13599 #	DOE/ET-23007/80/2	p 137	N83-14746 #
DE82-015671	p 46	N83-10598 #	DE82-020924	p 51	N83-12548 #	DOE/ET-27133-T2-VOL-1	p 10	N83-12544 #
DE82-015673	p 46	N83-10597 #	DE82-021010	p 97	N83-12571 #	DOE/ET-27256/T10	p 89	N83-10611 #
DE82-015790	p 46	N83-10607 #	DE82-021022	p 100	N83-13277 #	DOE/ET-27256/T20	p 93	N83-11587 #
DE82-015791	p 48	N83-11588 #	DE82-021120	p 132	N83-13001 #	DOE/ET-28341/T1	p 98	N83-12704 #
DE82-015792	p 49	N83-11589 #	DE82-021123	p 53	N83-12570 #	DOE/ET-28406/1	p 97	N83-12541 #
DE82-015793	p 46	N83-10605 #	DE82-021143	p 163	N83-12583 #	DOE/ET-5047-VOL-8-APP-B	p 164	N83-13607 #
DE82-015881	p 89	N83-10606 #	DE82-021216	p 163	N83-12582 #	DOE/ET-5054/4	p 162	N83-12561 #
DE82-015998	p 46	N83-10599 #	DE82-021236	p 158	N83-12387 #	DOE/ET-51013/32	p 124	N83-10932 #
DE82-016179	p 52	N83-12562 #	DE82-021297	p 54	N83-12576 #	DOE/ET-51013/37	p 125	N83-10939 #
DE82-016182	p 125	N83-10937 #	DE82-021299	p 53	N83-12575 #	DOE/ET-51013/38	p 125	N83-10933 #
DE82-016244	p 126	N83-10945 #	DE82-021300	p 53	N83-12574 #	DOE/ET-51013/40	p 125	N83-10934 #
DE82-016270	p 131	N83-12564 #	DE82-021301	p 54	N83-12586 #	DOE/ET-51013/41	p 132	N83-13007 #
DE82-016364	p 126	N83-10943 #	DE82-021302	p 54	N83-12577 #	DOE/ET-52042/5	p 123	N83-10880 #
DE82-016369	p 132	N83-13008 #	DE82-021359	p 54	N83-12588 #	DOE/ET-52048/21	p 138	N83-15132 #
DE82-016410	p 48	N83-11585 #	DE82-021360	p 57	N83-13603 #	DOE/ET-52048/22	p 138	N83-15135 #
DE82-016616	p 132	N83-13006 #	DE82-021542	p 102	N83-13602 #	DOE/ET-53016/78	p 127	N83-10952 #
DE82-016913	p 47	N83-10610 #	DE82-021611	p 54	N83-12587 #	DOE/ET-53051/41	p 120	N83-10366 #
DE82-016923	p 123	N83-10897 #	DE82-021683	p 56	N83-13597 #	DOE/ET-53051/42	p 134	N83-13998 #
DE82-016924	p 48	N83-11586 #	DE82-021698	p 50	N83-12538 #	DOE/ET-53088/42	p 155	N83-16229 #
DE82-016958	p 99	N83-13005 #	DE82-021701	p 50	N83-12539 #			
DE82-016999	p 52	N83-12563 #	DE82-021703	p 50	N83-12540 #	DOE/EV-02958/6	p 81	N83-10140 #
DE82-017001	p 121	N83-10603 #	DE82-021835	p 158	N83-12344 #	DOE/EV-02989/2	p 15	N83-13649 #
DE82-017098	p 126	N83-10951 #	DE82-021878	p 10	N83-12581 #			
DE82-017120	p 121	N83-10604 #	DE82-021951	p 98	N83-12706 #	DOE/FE-55014/T1	p 103	N83-13605 #
DE82-017122	p 121	N83-10601 #	DE82-021954	p 53	N83-12569 #			
DE82-017127	p 125	N83-10934 #	DE82-021956	p 53	N83-12568 #	DOE/GFETC/RI-82/2	p 95	N83-12201 #
DE82-017353	p 120	N83-10366 #	DE82-021958	p 56	N83-13596 #			
DE82-017384	p 123	N83-10908 #	DE82-021977	p 95	N83-12201 #	DOE/ID-01719/5	p 102	N83-13602 #
DE82-017394	p 99	N83-12788 #	DE82-021997	p 53	N83-12567 #	DOE/ID-12138/2	p 15	N83-13644 #
DE82-017396	p 125	N83-10935 #	DE82-022154	p 10	N83-12580 #			
DE82-017467	p 127	N83-10958 #	DE82-750056	p 133	N83-13608 #	DOE/JPL-1012-70	p 61	N83-14685 #
DE82-017766	p 134	N83-13994 #	DE82-750057	p 133	N83-13372 #	DOE/JPL-1012-71	p 39	N83-10505 #
DE82-017768	p 134	N83-13993 #	DE82-900588	p 111	N83-15951 #	DOE/JPL-1012-74	p 55	N83-13583 #
DE82-018269	p 86	N83-10570 #	DE82-904385	p 103	N83-13694 #	DOE/JPL-1012-75	p 45	N83-10552 #
DE82-018409	p 126	N83-10941 #	DE82-904440	p 14	N83-13620 #	DOE/JPL-1012-76	p 56	N83-13586 #
DE82-018598	p 98	N83-12584 #	DE82-904441	p 15	N83-13621 #	DOE/JPL-1012-77-VOL-1	p 45	N83-10553 #
DE82-018786	p 95	N83-12204 #	DE82-904490	p 89	N83-10613 #	DOE/JPL-1060-53-VOL-1	p 55	N83-13582 #
DE82-018816	p 97	N83-12440 #	DE82-905804	p 57	N83-13623 #	DOE/JPL-1060-53-VOL-2	p 55	N83-13581 #
DE82-018899	p 15	N83-13649 #	DE82-905832	p 12	N83-13402 #	DOE/JPL-1060-55	p 4	N83-10551 #
DE82-019043	p 81	N83-10140 #	DE82-906429	p 57	N83-13622 #	DOE/JPL-106052	p 42	N83-10525 #
DE82-019082	p 57	N83-13615 #	DE82-906444	p 14	N83-13619 #	DOE/JPL-954527-82	p 60	N83-14676 #
DE82-019085	p 57	N83-13604 #	DE82-906445	p 164	N83-13618 #	DOE/JPL-954929-82/9	p 59	N83-14670 #
DE82-019258	p 14	N83-13617 #				DOE/JPL-955392-1	p 60	N83-14681 #
DE82-019283	p 164	N83-13612 #	DFVLR-FB-82-09	p 9	N83-11887 #	DOE/JPL-955533-81-7	p 59	N83-14673 #
DE82-019284	p 164	N83-13610 #				DOE/JPL-955676-2	p 60	N83-14680 #
DE82-019309	p 15	N83-13647 #	DK-621 352 6 035 2	p 128	N83-11601 #	DOE/JPL-955688-81/5	p 59	N83-14674 #
DE82-019371	p 137	N83-14747 #				DOE/JPL-955843-82/5	p 58	N83-14665 #
DE82-019373	p 127	N83-10952 #	DOE-BETC-OR-18	p 105	N83-14206 #	DOE/JPL-955843-82/6	p 59	N83-14675 #
DE82-019375	p 134	N83-13997 #				DOE/JPL-955843-82/7	p 59	N83-14669 #
DE82-019435	p 100	N83-13197 #	DOE/ARS-3707-20741/81-1	p 131	N83-12564 #	DOE/JPL-955909-82-7	p 59	N83-14671 #
DE82-019500	p 103	N83-13605 #				DOE/JPL-955986-3	p 60	N83-14679 #
DE82-019733	p 124	N83-10928 #	DOE/BETC-81/3	p 111	N83-15803 #	DOE/JPL-956061-4	p 60	N83-14682 #
DE82-019772	p 13	N83-13465 #				DOE/JPL-956061-5	p 58	N83-14668 #
DE82-019775	p 135	N83-13999 #	DOE/BETC/TPR-82/1	p 95	N83-12202 #	DOE/JPL-956312-82/01	p 60	N83-14677 #
DE82-019781	p 162	N83-12561 #						
DE82-019796	p 162	N83-11584 #	DOE/BP-125	p 52	N83-12557 #	DOE/MC-14129/1208	p 95	N83-12204 #
DE82-019802	p 135	N83-14000 #				DOE/MC-16221/T5	p 106	N83-14300 #
DE82-019859	p 57	N83-13616 #	DOE/CE-034	p 76	N83-13276 #			
DE82-019888	p 134	N83-13998 #				DOE/METC-82-48	p 100	N83-13197 #
DE82-019897	p 13	N83-13516 #	DOE/CS-0015	p 104	N83-14178 #			
DE82-019923	p 14	N83-13614 #	DOE/CS-20234-1	p 19	N83-14753 #	DOE/NASA-0032-15	p 140	N83-15176 #
DE82-019928	p 133	N83-13714 #	DOE/CS-20245/2-VOL-1	p 99	N83-13041 #	DOE/NASA-0032-15	p 140	N83-15177 #
DE82-019953	p 14	N83-13613 #	DOE/CS-24312/4	p 10	N83-12580 #	DOE/NASA-0167-81-2	p 132	N83-13038 #
DE82-019993	p 164	N83-13611 #	DOE/CS-30201-T9	p 57	N83-13615 #	DOE/NASA-2818-1	p 102	N83-13588 #
DE82-020077	p 10	N83-12544 #	DOE/CS-31501-T1	p 57	N83-13616 #	DOE/NASA-3163-1	p 133	N83-13359 #
DE82-020118	p 49	N83-12386 #	DOE/CS-40402/1	p 104	N83-14178 #			
DE82-020255	p 52	N83-12557 #	DOE/CS-50025/2	p 100	N83-13277 #	DOE/NASA/0032-17-VOL-2	p 127	N83-10991 #
DE82-020273	p 52	N83-12558 #	DOE/CS-56051/7	p 96	N83-12255 #	DOE/NASA/0059-82/1	p 120	N83-10349 #
DE82-020275	p 13	N83-13595 #				DOE/NASA/0060-82/1	p 169	N83-16257 #
DE82-020277	p 132	N83-13003 #	DOE/DP-40138/1	p 124	N83-10931 #	DOE/NASA/0091-1	p 100	N83-13272 #
DE82-020287	p 101	N83-13464 #				DOE/NASA/0091-2	p 96	N83-12250 #
DE82-020289	p 102	N83-13601 #	DOE/EP-0032	p 11	N83-12659 #	DOE/NASA/0131-1	p 128	N83-11579 #
DE82-020394	p 51	N83-12549 #				DOE/NASA/0161-9A	p 130	N83-12524 #
DE82-020398	p 51	N83-12553 #	DOE/ER-0113	p 134	N83-13974 #	DOE/NASA/0168-80/1	p 129	N83-12431 #
DE82-020399	p 51	N83-12555 #	DOE/ER-0120	p 97	N83-12480 #	DOE/NASA/0180-6	p 56	N83-13585 #
DE82-020400	p 52	N83-12556 #	DOE/ER-0132	p 123	N83-10897 #	DOE/NASA/0212-1	p 121	N83-10561 #
DE82-020416	p 99	N83-12785 #	DOE/ER-70067-T1	p 51	N83-12552 #	DOE/NASA/1011-36	p 127	N83-11063 #
DE82-020417	p 102	N83-13557 #				DOE/NASA/10350-30	p 83	N83-10208 #
DE82-020420	p 51	N83-12550 #	DOE/ET-10015/70	p 99	N83-13005 #	DOE/NASA/10769-28	p 133	N83-13589 #
DE82-020429	p 102	N83-13552 #	DOE/ET-10329/1211-VOL-1	p 84	N83-10212 #	DOE/NASA/12726-18	p 166	N83-14683 #
DE82-020430	p 102	N83-13553 #	DOE/ET-10340/119	p 129	N83-12437 #	DOE/NASA/13111-10	p 86	N83-10559 #
DE82-020431	p 102	N83-13558 #	DOE/ET-10482/T3	p 20	N83-14776 #	DOE/NASA/13111-11	p 85	N83-10557 #
DE82-020436	p 102	N83-13559 #	DOE/ET-10482/T4	p 108	N83-14775 #	DOE/NASA/13111-12	p 85	N83-10556 #
DE82-020438	p 102	N83-13554 #	DOE/ET-12489/T1	p 89	N83-10606 #	DOE/NASA/13111-13	p 76	N83-10560 #
DE82-020493	p 96	N83-12255 #	DOE/ET-12548/14	p 85	N83-10503 #	DOE/NASA/20320-35	p 136	N83-14688 #
DE82-020494	p 76	N83-13276 #	DOE/ET-17156/T1	p 5	N83-10600 #	DOE/NASA/20320-40	p 136	N83-14689 #
DE82-020506	p 50	N83-12547 #	DOE/ET-20279-155	p 68	N83-14762 #	DOE/NASA/20485-12	p 136	N83-14690 #
DE82-020591	p 13	N83-13598 #	DOE/ET-20279-220	p 51	N83-12553 #	DOE/NASA/20485-43	p 73	N83-15840 #
DE82-020595	p 56	N83-13600 #	DOE/ET-20279/189	p 53	N83-12570 #			
DE82-020596	p 98	N83-12704 #	DOE/ET-20279/197	p 52	N83-12556 #			
DE82-020599	p 163	N83-12573 #	DOE/ET-20279/201	p 50	N83-12547 #	DOE/NBB-0011-VOL-1	p 13	N83-13594 #
DE82-020608	p 162	N83-12572 #	DOE/ET-20279/202	p 51	N83-12555 #	DOE/NBB-0011-VOL-2	p 13	N83-13595 #

DOE/NBM-1005

REPORT NUMBER INDEX

DOE/NBM-1005	p 19	N83-14745 #	EPA-600/7-82-028	p 103	N83-13673 #	GRI-81/0026	p 97	N83-12256 #
DOE/NBM-2011507	p 127	N83-10953 #	EPA-600/7-82-034	p 16	N83-13665 #	GRI-81/0027	p 131	N83-12592 #
DOE/NBM-2019085	p 57	N83-13604 #	EPA-600/7-82-035	p 100	N83-13279 #	GRI-81/0036	p 76	N83-12206 #
			EPA-600/7-82-039	p 16	N83-13659 #	GRI-81/0040	p 92	N83-11349 #
DOE/NV-10220/1	p 98	N83-12584 #	EPA-600/9-82-008	p 17	N83-13669 #	GRI-81/0050	p 84	N83-10213 #
						GRI-82/0008	p 82	N83-10160 #
DOE/PC-30021/T7	p 105	N83-14207 #	EPRI-AP-2474	p 57	N83-13622 #	GRI-82/0009 1	p 91	N83-10641 #
DOE/PC-30134-1	p 105	N83-14208 #	EPRI-AP-2516-SR	p 57	N83-13623 #	GRI-82/0009 2-VOL-1	p 159	N83-13310 #
DOE/PC-30144/T5	p 106	N83-14301 #				GRI-82/0009 3-VOL-2	p 159	N83-13311 #
DOE/PC-30177-2	p 105	N83-14198 #	EPRI-EA-2512	p 14	N83-13619 #			
DOE/PC-30291-4	p 109	N83-15402 #				GTEC-31-3725(2)	p 132	N83-13038* #
DOE/PC-30304/3	p 94	N83-12199 #	EPRI-EM-1589-VOL-8-APP-B	p 164	N83-13607 #			
DOE/PC-30305/T4	p 21	N83-15401 #	EPRI-EM-2193-VOL-3	p 10	N83-12559 #	GTFR-30	p 126	N83-10951 #
DOE/PC-40285/T1	p 106	N83-14299 #	EPRI-EM-2210-VOL-4	p 162	N83-12561 #			
			EPRI-EM-2319	p 12	N83-13402 #	HDL-TR-1989	p 163	N83-13590 #
DOE/PC/10231-T1	p 110	N83-15497 #	EPRI-EM-2351-VOL-1	p 164	N83-13610 #			
DOE/PC/30300/T4	p 76	N83-14204 #	EPRI-EM-2351-VOL-2	p 164	N83-13611 #	HL82/1200	p 165	N83-13627 #
DOE/PC/30301/4	p 105	N83-14205 #	EPRI-EM-2486-VOL-1	p 164	N83-13618 #			
			EPRI-EM-2497	p 164	N83-13612 #	HTGL-127/48	p 105	N83-14198 #
DOE/PE-70044/T5	p 14	N83-13606 #						
			FRC-90-6194(13)	p 128	N83-11607 #	IAEA-SR-57/42	p 22	N83-16195 #
DOE/PE/70045-T3	p 97	N83-12440 #						
			ERDA-81-16	p 129	N83-12327 #	IAEA-TECDOC-240	p 21	N83-15114 #
DOE/RA-50299-1119-VOL-4	p 10	N83-12542 #						
DOE/RA-50329/1	p 14	N83-13617 #	ESA-CR(P)-1617	p 57	N83-13626 #	IIASA-RR-82-16	p 158	N83-10498 #
			ESA-CR(P)-1631	p 159	N83-13248 #	IIASA-RR-82-20	p 3	N83-10499 #
DOE/R5-10301/1-FINAL	p 99	N83-12788 #	ESA-CR(P)-1637	p 165	N83-13627 #			
DOE/R5-10309/1	p 121	N83-10602 #				INPE-2410-PRE/119	p 18	N83-14575* #
			ESA-SP-173	p 61	N83-14694 #	INPE-2558-TDL/104	p 129	N83-12520 #
DOE/S-0010-82	p 10	N83-12581 #						
			EUR-CEA-FC-1094	p 155	N83-16226 #	IPPCZ-244	p 150	N83-16114 #
DOE/TIC-1029916	p 17	N83-13972 #						
			EUR-6893	p 21	N83-15115 #	IPPJ-577	p 124	N83-10922 #
DOT-TSC-RSPA-81-13	p 84	N83-10430 #	EUR-7088-DE	p 165	N83-13637 #	IPPJ-587	p 123	N83-10920 #
						IPPJ-594	p 123	N83-10919 #
DOT/FAA-CT-82-19	p 95	N83-12246* #	EUT-82-E-124	p 140	N83-15144 #	IPPJ-599	p 124	N83-10921 #
						IPPJ-602	p 123	N83-10917 #
DOT/FAA/RD-82/43	p 99	N83-13089 #	E83-10066	p 18	N83-14575* #	IPPJ-607	p 134	N83-13990 #
						IPPJ-608	p 131	N83-12995 #
DP-MS-81-36	p 17	N83-13973 #	FAA-CT-82-20	p 96	N83-12248* #	IPPJ-609	p 131	N83-12996 #
DP-MS-81-54	p 21	N83-15113 #				IPPJ-610	p 131	N83-12997 #
			FAA-EM-82-29	p 106	N83-14291 #	IPPJ-611	p 138	N83-15126 #
DRD-SE-2	p 59	N83-14671* #				IPPJ-612	p 134	N83-13989 #
DRD-SE-6	p 59	N83-14674* #	FCR-2585	p 122	N83-10637 #			
						IS-4794	p 86	N83-10570 #
DRL-157	p 59	N83-14671* #	FE-2291-98A	p 101	N83-13464 #			
						ISBN-0-309-03226-1	p 7	N83-10665 #
D1 1982	p 49	N83-11605 #	FHWA-CO-81-11	p 97	N83-12390 #	ISBN-0-7988-2047-0	p 161	N83-11578 #
D4 1981	p 165	N83-13635 #				ISBN-3-7045-0036-4	p 158	N83-10498 #
			FOA-C-10202-M2	p 5	N83-10628 #	ISBN-3-7045-0040-2	p 3	N83-10499 #
E-1052	p 83	N83-10208* #	FOA-C-20460-T1	p 104	N83-13695 #	ISBN-90-6144-124-2	p 140	N83-15144 #
E-1108	p 136	N83-14688* #				ISBN-91-540-3609-7	p 49	N83-11605 #
E-1127	p 92	N83-11340* #	FTD-ID(RS)T-0802-82	p 154	N83-16143 #	ISBN-91-540-3653-4	p 162	N83-11610 #
E-1240	p 136	N83-14689* #	FTD-ID(RS)T-0877-82	p 162	N83-11582 #	ISBN-92-63-00596-6	p 170	N83-12736 #
E-1271	p 119	N83-10134* #				ISBN-951-38-1284-7	p 3	N83-10152 #
E-1315	p 111	N83-15805* #	GA-A-16552	p 155	N83-16231 #			
E-1340	p 166	N83-14683* #	GA-A-16738	p 123	N83-10908 #	ISSN-0340-7608	p 81	N83-10142 #
E-1354	p 45	N83-10554* #				ISSN-0340-7608	p 81	N83-10143 #
E-1372	p 160	N83-10558* #	GAO/CED-82-72	p 19	N83-14767 #	ISSN-0340-7608	p 82	N83-10145 #
E-1378	p 119	N83-10135* #				ISSN-0340-7608	p 82	N83-10146 #
E-1384	p 48	N83-10962* #	GAO/EMD-82-44	p 18	N83-14664 #	ISSN-0340-7608	p 157	N83-10368 #
E-1386	p 45	N83-10555* #				ISSN-0340-7608	p 120	N83-10369 #
E-1412	p 167	N83-15372* #	GAO/PLRD-82-74	p 18	N83-14074 #	ISSN-0340-7608	p 158	N83-10370 #
E-1417	p 85	N83-10557* #				ISSN-0340-7608	p 158	N83-10397 #
E-1418	p 86	N83-10559* #	GC-TR-82-256	p 112	N83-16212 #	ISSN-0340-7608	p 158	N83-10428 #
E-1419	p 85	N83-10556* #				ISSN-0340-7608	p 84	N83-10479 #
E-1423	p 136	N83-14690* #	GERPDC-81-603	p 6	N83-10642 #	ISSN-0340-7608	p 161	N83-10614 #
E-1434	p 76	N83-10560* #				ISSN-0340-7608	p 89	N83-10615 #
E-1461	p 133	N83-13589* #	GJBX-312-81	p 108	N83-14795 #	ISSN-0340-7608	p 90	N83-10616 #
E-1472	p 77	N83-16153* #	GJBX-66-82	p 102	N83-13554 #	ISSN-0340-7608	p 90	N83-10617 #
E-1473	p 73	N83-15840* #	GJBX-69-82	p 102	N83-13559 #	ISSN-0340-7608	p 5	N83-10618 #
E-978	p 136	N83-14691* #	GJBX-78-82	p 102	N83-13558 #	ISSN-0340-7608	p 161	N83-10619 #
			GJBX-80-82	p 102	N83-13553 #	ISSN-0340-7608	p 47	N83-10620 #
EDE-10/82	p 84	N83-10426 #	GJBX-85-82	p 102	N83-13552 #	ISSN-0340-7608	p 47	N83-10621 #
			GJBX-87-82	p 102	N83-13557 #	ISSN-0340-7608	p 47	N83-10622 #
						ISSN-0340-7608	p 90	N83-10623 #
EECE-274(82)-NASA-931-1	p 46	N83-10567* #	GPO-86-217	p 10	N83-12521 #	ISSN-0340-7608	p 122	N83-10624 #
			GPO-91-371	p 8	N83-11611 #	ISSN-0340-7608	p 90	N83-10625 #
EGG-FT-5885	p 127	N83-10958 #				ISSN-0340-7608	p 47	N83-10626 #
			GRI-77/0015	p 122	N83-10637 #	ISSN-0340-7608	p 161	N83-10627 #
EMD-82-63	p 19	N83-14770 #	GRI-79/0103.2	p 11	N83-12593 #	ISSN-0340-7608	p 90	N83-10629 #
			GRI-79/01031	p 11	N83-12590 #	ISSN-0340-7608	p 90	N83-10631 #
EPA-AA-CTAB-PA-82-7	p 6	N83-10663 #	GRI-79/0113	p 95	N83-12208 #	ISSN-0340-7608	p 48	N83-10632 #
			GRI-80/0048	p 94	N83-11653 #	ISSN-0340-7608	p 122	N83-10633 #
EPA-460/3-82-002	p 101	N83-13281 #	GRI-80/0094	p 12	N83-12665 #	ISSN-0340-7608	p 6	N83-10651 #
EPA-460/3-82-002	p 101	N83-13282 #	GRI-80/0095	p 12	N83-12666 #	ISSN-0340-7608	p 91	N83-10652 #
EPA-600/2-82-004	p 17	N83-13670 #	GRI-80/0101	p 133	N83-13633 #	ISSN-0340-7608	p 91	N83-10705 #
EPA-600/2-82-006	p 58	N83-13672 #	GRI-80/0115	p 8	N83-11604 #	ISSN-0340-7608	p 48	N83-10718 #
EPA-600/2-82-011	p 17	N83-13666 #	GRI-80/0116	p 82	N83-10156 #	ISSN-0340-7608	p 92	N83-10719 #
EPA-600/3-82-058	p 101	N83-13283 #	GRI-80/0126	p 128	N83-11607 #	ISSN-0340-7608	p 92	N83-11364 #
EPA-600/4-81-079	p 16	N83-13658 #	GRI-80/0131	p 12	N83-13217 #	ISSN-0340-7608	p 93	N83-11365 #
EPA-600/4-82-036	p 16	N83-13657 #	GRI-80/0134	p 3	N83-10429 #	ISSN-0340-7608	p 128	N83-11590 #
EPA-600/7-81-171C	p 93	N83-11377 #	GRI-81/0005	p 91	N83-10638 #	ISSN-0340-7608	p 7	N83-11591 #
EPA-600/7-82-009	p 98	N83-12667 #	GRI-81/0009	p 92	N83-10756 #	ISSN-0340-7608	p 7	N83-11592 #
EPA-600/7-82-018	p 101	N83-13280 #	GRI-81/0013 1	p 8	N83-11609 #	ISSN-0340-7608	p 7	N83-11593 #
EPA-600/7-82-025B	p 16	N83-13664 #	GRI-81/0024	p 101	N83-13284 #	ISSN-0340-7608	p 8	N83-11594 #
EPA-600/7-82-026	p 12	N83-12668 #						

REPORT NUMBER INDEX

NASA-CR-169642

ISSN-0340-7608	p 84	N83-11595 #	ME-TN-81-9180-3	p 39	N83-10500 #	NAS 1 26 169617	p 60	N83-14680* #
ISSN-0340-7608	p 84	N83-11596 #				NAS 1 26 169620	p 59	N83-14670* #
ISSN-0340-7608	p 8	N83-11597 #	MIT-EL-81-044	p 3	N83-10302 #	NAS 1 26 169621	p 58	N83-14668* #
ISSN-0340-7608	p 49	N83-11598 #				NAS 1 26 169622	p 60	N83-14682* #
ISSN-0340-7608	p 162	N83-11599 #	MIT/EL-81-043	p 11	N83-12591 #	NAS 1 26 169623	p 106	N83-14293* #
ISSN-0340-7608	p 94	N83-11600 #	MIT/EL-82-010	p 103	N83-13631 #	NAS 1 26 169624	p 58	N83-14665* #
ISSN-0340-7608	p 128	N83-11601 #				NAS 1 26 169625	p 58	N83-14666* #
ISSN-0340-7608	p 9	N83-11617 #	MLM-EGSP-TPR-Q-018	p 111	N83-15802 #	NAS 1 26 169632	p 59	N83-14671* #
ISSN-0340-7608	p 101	N83-13378 #				NAS 1 26 169633	p 59	N83-14673* #
ISSN-0340-7608	p 16	N83-13651 #	MLM-MU-81-66-0012	p 111	N83-15802 #	NAS 1 26 169635	p 59	N83-14674* #
ISSN-0340-7608	p 16	N83-13652 #				NAS 1 26 169636	p 60	N83-14676* #
ISSN-0340-7608	p 68	N83-14763 #	MLM-2844	p 20	N83-14774 #	NAS 1 26 169637	p 59	N83-14675* #
ISSN-0340-7608	p 68	N83-14764 #				NAS 1 26 169639	p 59	N83-14669* #
ISSN-0340-7608	p 20	N83-14783 #	MRC-DA-1096-VOL-1	p 52	N83-12560 #	NAS 1 26 169640	p 60	N83-14677* #
ISSN-0358-5085	p 3	N83-10152 #				NAS 1 26 169641	p 60	N83-14681* #
ISSN-0379-6566	p 61	N83-14694 #	MRI-290	p 60	N83-14680* #	NAS 1 26 169642	p 60	N83-14678* #
ISSN-0389-4010	p 129	N83-12522 #	MRI-7014-G	p 83	N83-10207* #	NAS 1 26 169661	p 61	N83-14685* #
ISSN-0770-4615	p 86	N83-10563 #				NAS 1 26 169662	p 61	N83-14687* #
			MTI-82TR38	p 121	N83-10568* #	NAS 1 26 169664	p 61	N83-14686* #
JHU/APL/QM-81-130	p 6	N83-10636 #				NAS 1 26 170704	p 110	N83-15628* #
JHU/APL/QM-81-133	p 91	N83-10640 #	MTPR-11	p 128	N83-12088* #	NAS 1 60 2056	p 92	N83-11340* #
JHU/APL/QM-81-144	p 91	N83-10643 #				NAS 1.61 1099	p 135	N83-14684* #
JPL-BIBL-39-23	p 170	N83-14016* #	NAL-TR-698	p 129	N83-12522 #	NASA-CASE-GSC-12812-1	p 159	N83-12525* #
JPL-PUB-82-15	p 85	N83-10503* #	NAS 1 15 77154	p 13	N83-13587* #	NASA-CASE-LEW-12892-1	p 61	N83-14692* #
JPL-PUB-82-30	p 120	N83-10504* #	NAS 1 15 82695	p 136	N83-14691* #	NASA-CASE-LEW-13131-1	p 39	N83-10494* #
JPL-PUB-82-35	p 61	N83-14685* #	NAS 1 15 82739	p 83	N83-10208* #	NASA-CASE-LEW-13620-1	p 55	N83-13579* #
JPL-PUB-82-40	p 95	N83-12246* #	NAS 1 15 82778	p 136	N83-14688* #			
JPL-PUB-82-48	p 39	N83-10505* #	NAS 1 15 82818	p 127	N83-11063* #	NASA-CASE-MFS-25717-1	p 107	N83-14607* #
JPL-PUB-82-60-VOL-1	p 55	N83-13582* #	NAS 1 15 82870	p 136	N83-14689* #			
JPL-PUB-82-60-VOL-2	p 55	N83-13581* #	NAS 1 15 82893	p 119	N83-10134* #	NASA-CASE-MSC-18794-1	p 136	N83-14693* #
JPL-PUB-82-63	p 61	N83-14686* #	NAS 1 15 82923	p 111	N83-15805* #			
JPL-PUB-82-65	p 55	N83-13583* #	NAS 1 15 82940	p 166	N83-14683* #	NASA-CASE-NPO-14369-1	p 75	N83-10501* #
JPL-PUB-82-66	p 42	N83-10525* #	NAS 1 15 82948	p 45	N83-10554* #			
JPL-PUB-82-69	p 61	N83-14687* #	NAS 1 15 82957	p 160	N83-10558* #			
JPL-PUB-82-70	p 4	N83-10551* #	NAS 1 15 82961	p 119	N83-10135* #	NASA-CR-159859	p 9	N83-12094* #
JPL-PUB-82-73	p 45	N83-10552* #	NAS 1 15 82965	p 48	N83-10962* #	NASA-CR-165178	p 129	N83-12431* #
JPL-PUB-82-81-VOL-1	p 45	N83-10553* #	NAS 1 15 82966	p 45	N83-10555* #	NASA-CR-165274	p 121	N83-10568* #
JPL-PUB-82-83	p 15	N83-13644* #	NAS 1 15 82981	p 167	N83-15372* #	NASA-CR-165329	p 132	N83-13038* #
JPL-PUBL-82-53	p 96	N83-12248* #	NAS 1 15 82985	p 85	N83-10557* #	NASA-CR-165462-A	p 130	N83-12524* #
JPL-PUBL-82-79	p 56	N83-13586* #	NAS 1 15 82986	p 86	N83-10559* #	NASA-CR-165541	p 56	N83-13585* #
			NAS 1 15 82987	p 85	N83-10556* #	NASA-CR-165543	p 121	N83-10561* #
			NAS 1 15 82991	p 136	N83-14690* #	NASA-CR-165591	p 21	N83-15659* #
			NAS 1 15 82998	p 76	N83-10560* #	NASA-CR-165601	p 119	N83-10348* #
JPL-5101-207	p 61	N83-14685* #	NAS 1 15 83025	p 133	N83-13589* #	NASA-CR-165962	p 170	N83-10379* #
JPL-5101-209	p 39	N83-10505* #	NAS 1 15 83034	p 77	N83-16153* #	NASA-CR-165982	p 4	N83-10562* #
JPL-5101-212	p 55	N83-13583* #	NAS 1 15 83035	p 73	N83-15840* #	NASA-CR-167842	p 102	N83-13588* #
JPL-5101-221	p 56	N83-13586* #	NAS 1 15 83038	p 167	N83-15169* #	NASA-CR-167845	p 133	N83-13359* #
JPL-5105-118	p 42	N83-10525* #	NAS 1 15 83241	p 4	N83-10566* #	NASA-CR-167907-1	p 140	N83-15177* #
			NAS 1 15 83959	p 161	N83-11580* #	NASA-CR-167907-2	p 140	N83-15176* #
J206-82-012/6203	p 154	N83-16214 #	NAS 1 15 84000	p 131	N83-12998* #	NASA-CR-167915	p 100	N83-13272* #
J510-82-007A/2112-VOL-1	p 84	N83-10212 #	NAS 1 26 167842	p 102	N83-13588* #	NASA-CR-167917	p 96	N83-12250* #
			NAS 1 26 159859	p 9	N83-12094* #	NASA-CR-167919	p 169	N83-16257* #
K/UR-421	p 102	N83-13554 #	NAS 1 26 165178	p 129	N83-12431* #	NASA-CR-167936	p 127	N83-10991* #
K/UR-424	p 102	N83-13559 #	NAS 1 26 165274	p 121	N83-10568* #	NASA-CR-167953	p 120	N83-10502* #
K/UR-433	p 102	N83-13558 #	NAS 1 26 165329	p 132	N83-13038* #	NASA-CR-167978	p 120	N83-10349* #
K/UR-435	p 102	N83-13553 #	NAS 1 26 165462-A	p 130	N83-12524* #	NASA-CR-167981	p 83	N83-10207* #
K/UR-440	p 102	N83-13552 #	NAS 1 26 165541	p 56	N83-13585* #	NASA-CR-167987	p 128	N83-11579* #
K/UR-442	p 102	N83-13557 #	NAS 1 26 165543	p 121	N83-10561* #	NASA-CR-168020	p 140	N83-15839* #
			NAS 1 26 165591	p 21	N83-15659* #	NASA-CR-169365	p 42	N83-10525* #
KICT-35	p 39	N83-10286 #	NAS 1 26 165601	p 119	N83-10348* #	NASA-CR-169369	p 120	N83-10504* #
			NAS 1 26 165962	p 170	N83-10379* #	NASA-CR-169370	p 39	N83-10505* #
LA-UR-81-2423-REV	p 104	N83-14197 #	NAS 1 26 165982	p 4	N83-10562* #	NASA-CR-169372	p 45	N83-10553* #
LA-UR-81-2842	p 107	N83-14750 #	NAS 1 26 167845	p 133	N83-13359* #	NASA-CR-169373	p 4	N83-10551* #
LA-UR-81-2874	p 155	N83-16220 #	NAS 1 26 167907	p 140	N83-15176* #	NASA-CR-169385	p 95	N83-12246* #
LA-UR-81-2927	p 77	N83-15958 #	NAS 1 26 167907	p 140	N83-15177* #	NASA-CR-169388	p 96	N83-12248* #
LA-UR-81-2933	p 110	N83-15496 #	NAS 1 26 167915	p 100	N83-13272* #	NASA-CR-169395	p 84	N83-10214* #
LA-UR-81-3040	p 165	N83-14414 #	NAS 1 26 167917	p 96	N83-12250* #	NASA-CR-169429	p 85	N83-10503* #
LA-UR-81-3132	p 166	N83-14749 #	NAS 1 26 167919	p 169	N83-16257* #	NASA-CR-169431	p 45	N83-10552* #
LA-UR-81-3144	p 154	N83-16218 #	NAS 1 26 167936	p 127	N83-10991* #	NASA-CR-169435	p 46	N83-10567* #
LA-UR-81-3159	p 155	N83-16227 #	NAS 1 26 167953	p 120	N83-10502* #	NASA-CR-169475	p 128	N83-12088* #
LA-UR-81-3256	p 107	N83-14454 #	NAS 1 26 167978	p 120	N83-10349* #	NASA-CR-169513	p 15	N83-13644* #
LA-UR-81-3421	p 167	N83-15587 #	NAS 1 26 167981	p 83	N83-10207* #	NASA-CR-169517	p 55	N83-13583* #
LA-UR-81-3424	p 156	N83-16259 #	NAS 1 26 167987	p 128	N83-11579* #	NASA-CR-169518	p 56	N83-13586* #
LA-UR-81-3461	p 110	N83-15498 #	NAS 1 26 168020	p 140	N83-15839* #	NASA-CR-169519	p 170	N83-14016* #
LA-UR-81-3527	p 139	N83-15142 #	NAS 1 26 169365	p 42	N83-10525* #	NASA-CR-169526	p 55	N83-13581* #
			NAS 1 26 169369	p 120	N83-10504* #	NASA-CR-169527	p 55	N83-13582* #
LA-9L62-MS	p 134	N83-13996 #	NAS 1 26 169370	p 39	N83-10505* #	NASA-CR-169577	p 18	N83-14575* #
LA-9333-T	p 125	N83-10935 #	NAS 1 26 169372	p 45	N83-10553* #	NASA-CR-169593	p 165	N83-14667* #
LA-9342-PR	p 158	N83-12344 #	NAS 1 26 169373	p 4	N83-10551* #	NASA-CR-169616	p 60	N83-14679* #
LA-9344-MS	p 126	N83-10945 #	NAS 1 26 169385	p 95	N83-12246* #	NASA-CR-169617	p 60	N83-14680* #
			NAS 1 26 169388	p 96	N83-12248* #	NASA-CR-169620	p 59	N83-14670* #
LBL-PUB-448	p 14	N83-13613 #	NAS 1 26 169395	p 84	N83-10214* #	NASA-CR-169621	p 58	N83-14668* #
			NAS 1 26 169429	p 85	N83-10503* #	NASA-CR-169622	p 60	N83-14682* #
LBL-12722	p 137	N83-15104 #	NAS 1 26 169431	p 45	N83-10552* #	NASA-CR-169623	p 106	N83-14293* #
LBL-12818	p 67	N83-14751 #	NAS 1 26 169435	p 46	N83-10567* #	NASA-CR-169624	p 58	N83-14665* #
LBL-13449	p 108	N83-14752 #	NAS 1 26 169475	p 128	N83-12088* #	NASA-CR-169625	p 58	N83-14666* #
LBL-14038	p 124	N83-10930 #	NAS 1 26 169513	p 15	N83-13644* #	NASA-CR-169632	p 59	N83-14671* #
LBL-14305	p 163	N83-12573 #	NAS 1 26 169517	p 55	N83-13583* #	NASA-CR-169633	p 59	N83-14673* #
LBL-14639	p 56	N83-13600 #	NAS 1 26 169518	p 56	N83-13586* #	NASA-CR-169635	p 59	N83-14674* #
LBL-14674	p 162	N83-12572 #	NAS 1 26 169519	p 170	N83-14016* #	NASA-CR-169636	p 60	N83-14676* #
			NAS 1 26 169526	p 55	N83-13581* #	NASA-CR-169637	p 59	N83-14675* #
			NAS 1 26 169527	p 55	N83-13582* #	NASA-CR-169639	p 59	N83-14669* #
LMI-ML111	p 18	N83-14116 #	NAS 1 26 169577	p 18	N83-14575* #	NASA-CR-169640	p 60	N83-14677* #
			NAS 1 26 169593	p 165	N83-14667* #	NASA-CR-169641	p 60	N83-14681* #
MAI-81	p 10	N83-12285 #	NAS 1 26 169616	p 60	N83-14679* #	NASA-CR-169642	p 60	N83-14678* #

NASA-CR-169661

REPORT NUMBER INDEX

NASA-CR-169661	p 61	N83-14685* #	OTA-ISC-154	p 13	N83-13584 #	PB82-240086	p 16	N83-13664 #
NASA-CR-169662	p 61	N83-14687* #				PB82-243809	p 12	N83-13217 #
NASA-CR-169664	p 61	N83-14686* #	OWRT-C-00070-S(0444)(1)	p 7	N83-11277 #	PB82-249350	p 16	N83-13665 #
NASA-CR-170704	p 110	N83-15628* #						
NASA-RP-1099	p 135	N83-14684* #	PB82-022039	p 95	N83-12202 #	PFC/CP-82-2	p 125	N83-10933 #
			PB82-177304	p 119	N83-10159 #	PFC/CP-82-4	p 125	N83-10934 #
			PB82-179029	p 3	N83-10401 #	PFC/CP-82-5	p 132	N83-13007 #
NASA-TM-77154	p 13	N83-13587* #	PB82-180142	p 39	N83-10297 #			
NASA-TM-82695	p 136	N83-14691* #	PB82-180324	p 3	N83-10302 #	PFC/RR-82-6	p 124	N83-10932 #
NASA-TM-82739	p 83	N83-10208* #	PB82-181090	p 6	N83-10642 #	PFC/RR-82-9	p 125	N83-10939 #
NASA-TM-82778	p 136	N83-14688* #	PB82-182098	p 12	N83-12672 #			
NASA-TM-82818	p 127	N83-11063* #	PB82-183880	p 7	N83-10665 #	PNL-SA-9500	p 19	N83-14757 #
NASA-TM-82870	p 136	N83-14689* #	PB82-183997	p 91	N83-10643 #	PNL-SA-9657	p 20	N83-14781 #
NASA-TM-82893	p 119	N83-10134* #	PB82-184003	p 91	N83-10640 #	PNL-SA-9885	p 167	N83-14755 #
NASA-TM-82923	p 111	N83-15805* #	PB82-184086	p 91	N83-10641 #	PNL-SA-9890	p 167	N83-14758 #
NASA-TM-82940	p 166	N83-14683* #	PB82-184722	p 6	N83-10654 #			
NASA-TM-82948	p 45	N83-10554* #	PB82-184839	p 49	N83-12287 #	PNL-3970	p 50	N83-12545 #
NASA-TM-82957	p 160	N83-10558* #	PB82-184904	p 95	N83-12207 #	PNL-4003	p 48	N83-11586 #
NASA-TM-82961	p 119	N83-10135* #	PB82-184953	p 129	N83-12327 #	PNL-4283	p 99	N83-12785 #
NASA-TM-82965	p 48	N83-10962* #	PB82-184995	p 55	N83-12589 #	PNL-9884	p 166	N83-14754 #
NASA-TM-82966	p 45	N83-10555* #	PB82-185430	p 97	N83-12390 #			
NASA-TM-82981	p 167	N83-15372* #	PB82-188087	p 162	N83-11610 #	PNR-90114	p 7	N83-11136 #
NASA-TM-82985	p 85	N83-10557* #	PB82-188095	p 49	N83-11605 #			
NASA-TM-82986	p 86	N83-10559* #	PB82-188111	p 11	N83-12591 #	PPPL-1836	p 155	N83-16222 #
NASA-TM-82987	p 85	N83-10556* #	PB82-189564	p 10	N83-12285 #	PPPL-1841	p 154	N83-16217 #
NASA-TM-82991	p 136	N83-14690* #	PB82-190711	p 9	N83-11631 #			
NASA-TM-82998	p 76	N83-10560* #	PB82-190729	p 9	N83-11632 #	PPRP-57	p 6	N83-10661 #
NASA-TM-83025	p 133	N83-13589* #	PB82-194961	p 84	N83-10430 #			
NASA-TM-83034	p 77	N83-16153* #	PB82-195637	p 131	N83-12592 #	PR-20	p 39	N83-10505* #
NASA-TM-83035	p 73	N83-15840* #	PB82-196924	p 12	N83-12668 #	PR-27	p 111	N83-15803 #
NASA-TM-83038	p 167	N83-15169* #	PB82-196932	p 98	N83-12667 #			
NASA-TM-83241	p 4	N83-10566* #	PB82-197088	p 9	N83-11634 #	PRI-42	p 126	N83-10941 #
NASA-TM-83959	p 161	N83-11580* #	PB82-197096	p 9	N83-11633 #	PRI-45	p 135	N83-14000 #
NASA-TM-84000	p 131	N83-12998* #	PB82-197153	p 93	N83-11377 #	PRI-46	p 132	N83-13003 #
			PB82-197344	p 160	N83-10373 #			
NASA-TP-2056	p 92	N83-11340* #	PB82-198045	p 7	N83-11277 #	PUBL-SER-B-115	p 86	N83-10563 #
			PB82-198995	p 12	N83-12666 #			
NBS-BSS-140-LC-81-600191	p 49	N83-12287 #	PB82-199027	p 12	N83-12665 #	P500-81-015	p 8	N83-11606 #
			PB82-199035	p 97	N83-12257 #			
NBSIR-80-2176	p 3	N83-10401 #	PB82-199043	p 97	N83-12256 #	QPR-4	p 21	N83-15401 #
NBSIR-81-2345	p 95	N83-12207 #	PB82-200585	p 11	N83-12590 #	QPR-7	p 59	N83-14673* #
NBSIR-81-2379	p 55	N83-12589 #	PB82-200593	p 11	N83-12593 #			
NBSIR-81-2393	p 39	N83-10297 #	PB82-200637	p 95	N83-12208 #	QR-22	p 111	N83-15951 #
NBSIR-82-2498	p 49	N83-11608 #	PB82-200650	p 8	N83-11604 #	QR-2	p 146	N83-15907 #
NBSIR-82-2522	p 58	N83-13632 #	PB82-200676	p 128	N83-11607 #	QR-3	p 93	N83-11377 #
			PB82-200684	p 76	N83-12206 #	QR-3	p 94	N83-12199 #
NCEL-CR-82 028	p 19	N83-14739 #	PB82-200692	p 8	N83-11609 #	QR-3	p 146	N83-15901 #
			PB82-201773	p 6	N83-10663 #	QR-4	p 60	N83-14682* #
NCEL-TN-1641	p 136	N83-14740 #	PB82-202201	p 49	N83-11608 #	QR-5	p 58	N83-14668* #
			PB82-203647	p 82	N83-10154 #	QR-5	p 140	N83-15839* #
NE/VIND-80/39	p 133	N83-13608 #	PB82-206368	p 3	N83-10152 #	QR-7	p 59	N83-14671* #
NE/VIND-81/4	p 133	N83-13372 #	PB82-207366	p 91	N83-10638 #	QR-8	p 130	N83-12524* #
			PB82-208414	p 8	N83-11606 #			
NLR-MP-81014-U	p 130	N83-12527 #	PB82-213737	p 84	N83-10214* #	QTPR-4	p 105	N83-14205 #
			PB82-214347	p 82	N83-10156 #			
NMAB-390	p 165	N83-13634 #	PB82-214362	p 92	N83-10756 #	QTR-4	p 60	N83-14679* #
NMAB-395-2	p 15	N83-13630 #	PB82-215054	p 122	N83-10639 #			
			PB82-215146	p 6	N83-10636 #	R-64 125	p 47	N83-10620 #
NOAA-82042702	p 6	N83-10656 #	PB82-216102	p 122	N83-10637 #			
			PB82-217753	p 122	N83-10634 #	RAD-81-202-187-70-15	p 16	N83-13664 #
NP-2904440	p 14	N83-13620 #	PB82-217761	p 122	N83-10635 #			
NP-2904441	p 15	N83-13621 #	PB82-218439	p 39	N83-10286 #	RAG-K-330	p 90	N83-10617 #
NP-2905271	p 103	N83-13694 #	PB82-218462	p 6	N83-10656 #	RAG-317	p 158	N83-10428 #
			PB82-220070	p 6	N83-10661 #			
NRL-MR-4694	p 106	N83-14294 #	PB82-220542	p 94	N83-11653 #			
			PB82-22060	p 92	N83-11349 #	REPT-1253	p 8	N83-11604 #
NRL-8630	p 104	N83-14165 #	PB82-220732	p 103	N83-13636 #	REPT-262/ET-RER/80	p 129	N83-12327 #
			PB82-221219	p 18	N83-14312 #	REPT-2	p 165	N83-14667* #
NSWC/TR-82-128	p 166	N83-14743 #	PB82-221359	p 3	N83-10481 #	REPT-41 0801 43 11	p 90	N83-10623 #
			PB82-225780	p 15	N83-13630 #	REPT-50423	p 128	N83-11504 #
NWC-TP-6381	p 73	N83-15902 #	PB82-226481	p 163	N83-13415 #	REPT-74	p 103	N83-13694 #
			PB82-227349	p 165	N83-13634 #	REPT-80-57/EE	p 16	N83-13665 #
OEHL-TR-82-017EA206HEF	p 19	N83-14772 #	PB82-227620	p 3	N83-10429 #	REPT-80ASE142DR1-VOL-2	p 127	N83-10991* #
			PB82-227653	p 84	N83-10213 #	REPT-81-18452	p 58	N83-14666* #
OOR/81-4	p 122	N83-10639 #	PB82-227679	p 82	N83-10160 #	REPT-815-008	p 169	N83-16257* #
			PB82-227901	p 17	N83-13669 #	REPT-82ASE248SA1	p 140	N83-15176* #
ORAU/IEA-82-7(M)	p 98	N83-12706 #	PB82-229170	p 17	N83-13670 #	REPT-82ASE278SA2	p 140	N83-15177* #
			PB82-229790	p 58	N83-13672 #	REPT-9950-742	p 59	N83-14674* #
ORD-79-353	p 98	N83-12667 #	PB82-230921	p 103	N83-13673 #	REPT-9950-744	p 60	N83-14676* #
			PB82-230954	p 103	N83-13631 #			
ORNL/SUB-80-13644-1	p 169	N83-15957 #	PB82-231630	p 133	N83-13633 #	RFP-3305	p 131	N83-12565 #
			PB82-231671	p 101	N83-13284 #			
ORNL/TM-7356-PT-1	p 135	N83-13999 #	PB82-232331	p 165	N83-13635 #	RL-82-031	p 163	N83-13415 #
ORNL/TM-7658	p 127	N83-10957 #	PB82-232448	p 101	N83-13281 #			
ORNL/TM-7989	p 125	N83-10940 #	PB82-234147	p 101	N83-13282 #	RR-1685	p 128	N83-11579* #
ORNL/TM-8071	p 18	N83-14302 #	PB82-234238	p 16	N83-13657 #	RR-55	p 95	N83-12208 #
ORNL/TM-8082	p 126	N83-10942 #	PB82-234329	p 16	N83-13658 #			
ORNL/TM-8200	p 126	N83-10949 #	PB82-234618	p 16	N83-13659 #	RTI-43U-1955-14	p 19	N83-14772 #
ORNL/TM-8279	p 132	N83-13008 #	PB82-236936	p 100	N83-13279 #			
ORNL/TM-8282	p 126	N83-10943 #	PB82-236985	p 101	N83-13283 #	R80AEG396	p 9	N83-12094* #
ORNL/TM-8316	p 134	N83-13994 #	PB82-236993	p 17	N83-13666 #			
ORNL/TM-8320	p 76	N83-12206 #	PB82-237041	p 101	N83-13280 #	SABCA-JPM/LN/H05/N28	p 159	N83-13248 #
ORNL/TM-8393	p 124	N83-10928 #	PB82-237660	p 58	N83-13632 #			
ORNL/TM-8448	p 13	N83-13516 #	PB82-238130	p 165	N83-13637 #	SAI-254-82-134-LJ	p 126	N83-10941 #
			PB82-240060	p 159	N83-13310 #	SAI-254-82-200-LJ	p 135	N83-14000 #
OTA-E-186	p 12	N83-13270 #	PB82-240078	p 159	N83-13311 #	SAI-254-82-219-LJ	p 132	N83-13003 #

REPORT NUMBER INDEX

Y/EN-511

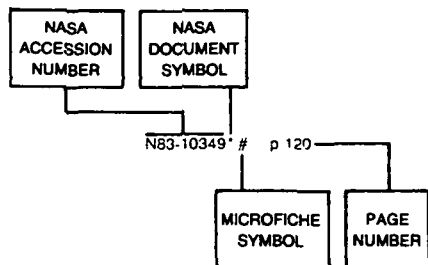
SAI-444-82-074-LJ	p 8	N83-11609 #	UCRL-86777	p 139	N83-15136 #
SAND-81-0683	p 138	N83-15118 #	UCRL-86794	p 112	N83-15952 #
SAND-81-1333C	p 139	N83-15140 #	UCRL-86831	p 139	N83-15139 #
SAND-81-1457	p 111	N83-15801 #	UCRL-86877	p 137	N83-15111 #
SAND-81-1702C	p 137	N83-14760 #	UCRL-86890-REV-1	p 122	N83-10879 #
SAND-81-1756C	p 137	N83-14756 #	UILLU-ENG-81-4003	p 39	N83-10500 #
SAND-81-1760C	p 135	N83-14545 #			
SAND-81-1780	p 46	N83-10599 #	US-PATENT-APPL-SN-126063	p 75	N83-10501* #
SAND-81-1804C	p 150	N83-15954 #	US-PATENT-APPL-SN-238785	p 136	N83-14693* #
SAND-81-1889C	p 74	N83-15942 #	US-PATENT-APPL-SN-242796	p 55	N83-13579* #
SAND-81-1973	p 111	N83-15951 #	US-PATENT-APPL-SN-246772	p 39	N83-10494* #
SAND-81-2000C	p 109	N83-15395 #	US-PATENT-APPL-SN-264380	p 61	N83-14692* #
SAND-81-2083	p 55	N83-13504 #	US-PATENT-APPL-SN-434674	p 159	N83-12525* #
SAND-81-2090C	p 74	N83-15953 #	US-PATENT-APPL-SN-441897	p 107	N83-14607* #
SAND-81-2141C	p 133	N83-13625 #			
SAND-81-2205C	p 139	N83-15143 #	US-PATENT-CLASS-136-255	p 61	N83-14692* #
SAND-81-2446C	p 137	N83-15116 #	US-PATENT-CLASS-136-256	p 55	N83-13579* #
SAND-81-7007	p 46	N83-10597 #	US-PATENT-CLASS-136-256	p 61	N83-14692* #
SAND-81-7019-VOL-2	p 53	N83-12566 #	US-PATENT-CLASS-136-259	p 55	N83-13579* #
SAND-81-7019/1	p 46	N83-10605 #	US-PATENT-CLASS-136-259	p 61	N83-14692* #
SAND-81-7085/10	p 49	N83-11589 #	US-PATENT-CLASS-204-56R	p 39	N83-10494* #
SAND-81-7086/10	p 48	N83-11588 #	US-PATENT-CLASS-29-572	p 55	N83-13579* #
SAND-81-7088-3	p 50	N83-12543 #	US-PATENT-CLASS-357-30	p 55	N83-13579* #
SAND-81-7088/7	p 46	N83-10607 #	US-PATENT-CLASS-417-399	p 136	N83-14693* #
SAND-81-7089/3	p 56	N83-13599 #	US-PATENT-CLASS-422-200	p 75	N83-10501* #
SAND-81-7099/6	p 47	N83-10608 #	US-PATENT-CLASS-422-202	p 75	N83-10501* #
SAND-81-7158C	p 167	N83-14759 #	US-PATENT-CLASS-422-224	p 75	N83-10501* #
SAND-81-7172	p 51	N83-12548 #	US-PATENT-CLASS-427-88	p 55	N83-13579* #
SAND-81-7194	p 52	N83-12562 #	US-PATENT-CLASS-427-89	p 55	N83-13579* #
SAND-82-0072	p 134	N83-13993 #	US-PATENT-CLASS-427-90	p 55	N83-13579* #
SAND-82-0672	p 121	N83-10603 #	US-PATENT-CLASS-427-91	p 55	N83-13579* #
SAND-82-0701	p 46	N83-10598 #	US-PATENT-CLASS-55-204	p 75	N83-10501* #
SAND-82-0934	p 47	N83-10610 #	US-PATENT-CLASS-74-110	p 136	N83-14693* #
SAND-82-7105	p 48	N83-11585 #			
SAND-82-7122	p 51	N83-12550 #	US-PATENT-4,335,196	p 55	N83-13579* #
SAND-82-8190	p 49	N83-12386 #	US-PATENT-4,343,772	p 75	N83-10501* #
			US-PATENT-4,350,574	p 39	N83-10494* #
SAPR-2	p 132	N83-13038* #	US-PATENT-4,360,325	p 136	N83-14693* #
			US-PATENT-4,360,701	p 61	N83-14692* #
SAR-1	p 129	N83-12431* #			
SERI/CP-635-1340-VOL-1	p 146	N83-15908 #	USAFA-TR-82-6-APP-B	p 73	N83-15905 #
			USAFA-TR-82-6-APP-C	p 73	N83-15904 #
SERI/PR-211-1672	p 133	N83-13714 #	USAFA-TR-82-6	p 74	N83-15906 #
SERI/TR-09172-2	p 121	N83-10604 #	USCG-D-65-81	p 146	N83-15903 #
SERI/TR-11052-1	p 121	N83-10601 #			
SERI/TR-214-1449	p 53	N83-12567 #	USGS-CIRC-861	p 94	N83-11638 #
SERI/TR-214-1567-VOL-1	p 56	N83-13596 #	USGS-CIRC-862	p 112	N83-15965 #
SERI/TR-214-1567-VOL-2	p 56	N83-13597 #			
SERI/TR-252-1438	p 57	N83-13603 #	USIP-82-04	p 15	N83-13628 #
SERI/TR-253-1450	p 54	N83-12587 #			
SERI/TR-255-1432	p 54	N83-12588 #	UTSI-81-6	p 99	N83-13005 #
SOLAR/1060-82/14	p 52	N83-12563 #	UWFDM-437	p 138	N83-15132 #
SOLAR/1109-82/14	p 53	N83-12575 #	UWFDM-448	p 138	N83-15135 #
SOLAR/1115-82/14	p 53	N83-12574 #			
SOLAR/1116-82/14	p 54	N83-12576 #	VKI-LS-1981-8	p 130	N83-12526 #
SOLAR/1117-82/14	p 50	N83-12539 #			
SOLAR/1118-82/14	p 50	N83-12538 #	VTH-LR-355	p 128	N83-11603 #
SOLAR/1120-82/14	p 54	N83-12577 #			
SOLAR/2122-82/14	p 50	N83-12540 #	VTT-15/1981	p 3	N83-10152 #
SOLAR/2125-82/14	p 54	N83-12586 #			
			WAOENG-82-04	p 13	N83-13598 #
SORI-EAS-80-387	p 16	N83-13659 #	WAOENG-82-11	p 51	N83-12549 #
SRD-81-088	p 120	N83-10349* #	WDL-TR9598	p 60	N83-14678* #
SRD-82-023	p 102	N83-13588* #			
			WFPS-TME-81-031	p 126	N83-10947 #
SUNYBUF/DC/TR-10	p 58	N83-14179 #			
			WMO-596	p 170	N83-12736
SWRI-6800-121	p 109	N83-15489 #			
SWRI-6800-123	p 104	N83-14189 #	XAL-72760-AL	p 130	N83-12524* #
TME-3158	p 59	N83-14671* #	Y/EN-511	p 110	N83-15499 #
TN-22	p 94	N83-12199 #			
TR-34	p 67	N83-14741 #			
TVA/OACD-82/9	p 89	N83-10613 #			
UCB-NE-4022	p 14	N83-13614 #			
UCID-19327	p 134	N83-13997 #			
UCID-19422	p 132	N83-13001 #			
UCID-19548	p 97	N83-12571 #			
UCRL-52000-82-6	p 137	N83-14747 #			
UCRL-53187	p 17	N83-13976 #			
UCRL-84821-REV-1	p 138	N83-15117 #			
UCRL-86124	p 155	N83-16228 #			
UCRL-86326	p 138	N83-15133 #			
UCRL-86467	p 22	N83-15960 #			
UCRL-86576	p 138	N83-15134 #			

ACCESSION NUMBER INDEX

ENERGY / A Continuing Bibliography (Issue 37)

APRIL 1983

Typical Accession Number Index Listing



Listings in this index are arranged alphanumerically by accession number. The page number listed to the right indicates the page on which the citation is located. An asterisk (*) indicates that the item is a NASA report. A pound sign (#) indicates that the item is available on microfiche.

A83-10030 #	p 77	A83-12038 #	p 1
A83-10031* #	p 77	A83-12054 #	p 160
A83-10032* #	p 77	A83-12055 #	p 160
A83-10041 #	p 77	A83-12056 #	p 114
A83-10069 #	p 1	A83-12059 #	p 24
A83-10100 #	p 22	A83-12287 #	p 25
A83-10115 #	p 22	A83-12290 #	p 25
A83-10186* #	p 1	A83-12295 #	p 75
A83-10294 #	p 22	A83-12321 #	p 25
A83-10428 #	p 22	A83-12466* #	p 114
A83-10439 #	p 1	A83-12475 #	p 25
A83-10638 #	p 23	A83-12508* #	p 75
A83-10641 #	p 112	A83-12596 #	p 25
A83-10651 #	p 159	A83-12686 #	p 2
A83-10654 #	p 112	A83-12791* #	p 25
A83-10656 #	p 112	A83-12799 #	p 26
A83-10658 #	p 78	A83-12800 #	p 26
A83-10659 #	p 113	A83-12951 #	p 26
A83-10661 #	p 113	A83-12954 #	p 79
A83-10665* #	p 113	A83-13460 #	p 114
A83-10675 #	p 113	A83-13473 #	p 26
A83-10699 #	p 23	A83-13476* #	p 26
A83-11007 #	p 23	A83-13477 #	p 26
A83-11021 #	p 113	A83-13478 #	p 27
A83-11050* #	p 78	A83-13479 #	p 27
A83-11156* #	p 1	A83-13480 #	p 27
A83-11283 #	p 156	A83-13481 #	p 27
A83-11482* #	p 78	A83-13482* #	p 27
A83-11491* #	p 78	A83-13501 #	p 27
A83-11493* #	p 78	A83-13580* #	p 28
A83-11509 #	p 160	A83-13581 #	p 28
A83-11510 #	p 23	A83-13582 #	p 28
A83-11515 #	p 156	A83-13583 #	p 28
A83-11525 #	p 156	A83-13647 #	p 28
A83-11696 #	p 23	A83-13648* #	p 28
A83-11764 #	p 23	A83-13649 #	p 28
A83-11766 #	p 23	A83-13650 #	p 114
A83-11768 #	p 24	A83-13677 #	p 29
A83-11777 #	p 113	A83-13695 #	p 114
A83-11794* #	p 74	A83-13696* #	p 114
A83-11802 #	p 24	A83-13697 #	p 29
A83-11803 #	p 24	A83-13698 #	p 29
A83-11811 #	p 24	A83-13699 #	p 29
A83-11813* #	p 160	A83-13700 #	p 29
A83-11831* #	p 79	A83-13701 #	p 29
A83-11837 #	p 113	A83-13702 #	p 29
A83-11848 #	p 24	A83-13743* #	p 29
A83-11849 #	p 24	A83-13807 #	p 30
A83-11868 #	p 113	A83-13922* #	p 30
A83-11896 #	p 1	A83-13923* #	p 30
A83-11952 #	p 114	A83-14000 #	p 2
A83-11988 #	p 79	A83-14041 #	p 115
A83-11991 #	p 24	A83-14045 #	p 160
A83-12029 #	p 24	A83-14056 #	p 79
A83-12036* #	p 79	A83-14109 #	p 30

A83-14115 #	p 115	A83-16736 #	p 80
A83-14120 #	p 79	A83-16946 #	p 36
A83-14238 #	p 80	A83-17115 #	p 169
A83-14256 #	p 80	A83-17149 #	p 118
A83-14512 #	p 30	A83-17150 #	p 36
A83-14513 #	p 30	A83-17347 #	p 36
A83-14517* #	p 2	A83-17371 #	p 118
A83-14669 #	p 80	A83-17493 #	p 36
A83-14671 #	p 30	A83-17701 #	p 169
A83-14725 #	p 115	A83-17766 #	p 36
A83-15130 #	p 31	A83-17767 #	p 36
A83-15131 #	p 31	A83-17770 #	p 36
A83-15132 #	p 31	A83-17801 #	p 36
A83-15133 #	p 31	A83-17849 #	p 80
A83-15135 #	p 31	A83-17928 #	p 118
A83-15136 #	p 31	A83-18139 #	p 36
A83-15371* #	p 31	A83-18446 #	p 157
A83-15452 #	p 32	A83-18451 #	p 37
A83-15454 #	p 32	A83-18452 #	p 37
A83-15455 #	p 32	A83-18456 #	p 80
A83-15457 #	p 32	A83-18457 #	p 118
A83-15458 #	p 32	A83-18494 #	p 119
A83-15461 #	p 32	A83-18497 #	p 37
A83-15463* #	p 32	A83-18554 #	p 37
A83-15476 #	p 32	A83-18557 #	p 37
A83-15479 #	p 33	A83-18558 #	p 37
A83-15480 #	p 33	A83-18559 #	p 37
A83-15482 #	p 33	A83-18560 #	p 81
A83-15483* #	p 33	A83-18562 #	p 160
A83-15488 #	p 33	A83-18563 #	p 38
A83-15490 #	p 33	A83-18564 #	p 38
A83-15492 #	p 33	A83-18565 #	p 38
A83-15493 #	p 33	A83-18581* #	p 169
A83-15496 #	p 34	A83-18812 #	p 2
A83-15497 #	p 34	A83-18825 #	p 38
A83-15499 #	p 34	A83-18939 #	p 119
A83-15509 #	p 34	A83-19148 #	p 38
A83-15510 #	p 34	A83-19150 #	p 2
A83-15511 #	p 34	A83-19161 #	p 157
A83-15517 #	p 115	A83-19194 #	p 38
A83-15841 #	p 80	A83-19236 #	p 38
A83-15867 #	p 115	A83-19238 #	p 38
A83-15869 #	p 115	A83-19259 #	p 39
A83-15871 #	p 34	A83-19609 #	p 119
A83-15909 #	p 115		
A83-16000 #	p 115	N83-10131 #	p 81
A83-16019 #	p 116	N83-10132 #	p 81
A83-16021 #	p 34	N83-10134* #	p 119
A83-16026 #	p 116	N83-10135* #	p 119
A83-16041 #	p 75	N83-10140 #	p 81
A83-16042 #	p 75	N83-10142 #	p 81
A83-16044 #	p 75	N83-10143 #	p 81
A83-16071 #	p 35	N83-10145 #	p 82
A83-16082 #	p 35	N83-10146 #	p 82
A83-16084 #	p 35	N83-10151 #	p 82
A83-16086 #	p 35	N83-10152 #	p 3
A83-16089 #	p 156	N83-10154 #	p 82
A83-16093 #	p 156	N83-10156 #	p 82
A83-16101 #	p 116	N83-10159 #	p 119
A83-16102 #	p 116	N83-10160 #	p 82
A83-16103 #	p 116	N83-10206 #	p 83
A83-16104 #	p 116	N83-10207* #	p 83
A83-16105 #	p 116	N83-10208* #	p 83
A83-16106 #	p 116	N83-10210 #	p 83
A83-16107 #	p 117	N83-10211 #	p 83
A83-16108 #	p 117	N83-10212 #	p 84
A83-16110 #	p 117	N83-10213 #	p 84
A83-16111 #	p 117	N83-10214* #	p 84
A83-16112 #	p 117	N83-10286 #	p 39
A83-16183 #	p 35	N83-10297 #	p 39
A83-16184 #	p 35	N83-10302 #	p 3
A83-16191 #	p 2	N83-10348* #	p 119
A83-16516 #	p 2	N83-10349* #	p 120
A83-16562 #	p 35	N83-10366 #	p 120
A83-16647 #	p 157	N83-10368 #	p 157
A83-16648 #	p 157	N83-10369 #	p 120
A83-16649* #	p 157	N83-10370 #	p 158
A83-16664 #	p 117	N83-10373 #	p 160
A83-16690 #	p 117	N83-10379* #	p 170
A83-16691* #	p 117	N83-10397 #	p 158
A83-16732 #	p 117	N83-10401 #	p 3
A83-16734 #	p 118	N83-10426 #	p 84
A83-16735* #	p 118	N83-10428 #	p 158

N83-10429 #	p 3	N83-10572 #	p 86
N83-10430 #	p 84		
N83-10479 #	p 84		
N83-10481 #	p 3		
N83-10494* #	p 39		
N83-10495 #	p 85		
N83-10496 #	p 120		
N83-10497 #	p 85		
N83-10498 #	p 158		
N83-10499 #	p 3		
N83-10500 #	p 39		
N83-10501* #	p 75		
N83-10509* #	p 120		
N83-10503* #	p 85		
N83-10504* #	p 120		
N83-10505* #	p 39		
N83-10506* #	p 3		
N83-10507* #	p 39		
N83-10508* #	p 40		
N83-10509* #	p 40		
N83-10510* #	p 40		
N83-10511* #	p 40		
N83-10512* #	p 40		
N83-10513* #	p 40		
N83-10514* #	p 40		
N83-10515* #	p 40		
N83-10516* #	p 40		
N83-10517* #	p 40		
N83-10518* #	p 41		
N83-10519* #	p 41		
N83-10520* #	p 41		
N83-10521* #	p 41		
N83-10522* #	p 41		
N83-10523* #	p 41		
N83-10524* #	p 41		
N83-10525* #	p 42		
N83-10526* #	p 42		
N83-10527* #	p 42		
N83-10528* #	p 42		
N83-10529* #	p 42		
N83-10530* #	p 42		
N83-10531* #	p 43		
N83-10532* #	p 43		
N83-10533* #	p 43		
N83-10534* #	p 43		
N83-10535* #	p 43		
N83-10536* #	p 43		
N83-10537* #	p 43		
N83-10538* #	p 44		
N83-10539* #	p 44		
N83-10540* #	p 44		
N83-10541* #	p 44		
N83-10542* #	p 44		
N83-10543* #	p 44		
N83-10544* #	p 44		
N83-10545* #	p 44		
N83-10546* #	p 45		
N83-10547* #	p 3		
N83-10548* #	p 45		
N83-10549* #	p 45		
N83-10550* #	p 4		
N83-10551* #	p 4		
N83-10552* #	p 45		
N83-10553* #	p 45		
N83-10554* #	p 45		
N83-10555* #	p 45		
N83-10556* #	p 85		
N83-10557* #	p 85		
N83-10558* #	p 160		
N83-10559* #	p 86		
N83-10560* #	p 76		
N83-10561* #	p 121		
N83-10562* #	p 4		
N83-10563* #	p 86		
N83-10564* #	p 45		
N83-10565* #	p 46		
N83-10566* #	p 4		
N83-10567* #	p 46		
N83-10568* #	p 121		
N83-10569 #	p 121		
N83-10570 #	p 86		
N83-10571 #	p 86		
N83-10572 #	p 86		

ACCESSION

N83-10573

ACCESSION NUMBER INDEX

N83-10573 # p 86
 N83-10574 # p 86
 N83-10575 # p 86
 N83-10576 # p 87
 N83-10577 # p 87
 N83-10578 # p 87
 N83-10579 # p 87
 N83-10580 # p 87
 N83-10581 # p 87
 N83-10582 # p 87
 N83-10583 # p 4
 N83-10584 # p 88
 N83-10585 # p 4
 N83-10586 # p 88
 N83-10587 # p 88
 N83-10588 # p 4
 N83-10589 # p 5
 N83-10590 # p 88
 N83-10591 # p 88
 N83-10592 # p 88
 N83-10593 # p 5
 N83-10594 # p 88
 N83-10595 # p 89
 N83-10596 # p 89
 N83-10597 # p 46
 N83-10598 # p 46
 N83-10599 # p 46
 N83-10600 # p 5
 N83-10601 # p 121
 N83-10602 # p 121
 N83-10603 # p 121
 N83-10604 # p 121
 N83-10605 # p 46
 N83-10606 # p 89
 N83-10607 # p 46
 N83-10608 # p 47
 N83-10610 # p 47
 N83-10611 # p 89
 N83-10612 # p 5
 N83-10613 # p 89
 N83-10614 # p 161
 N83-10615 # p 89
 N83-10616 # p 90
 N83-10617 # p 90
 N83-10618 # p 5
 N83-10619 # p 161
 N83-10620 # p 47
 N83-10621 # p 47
 N83-10622 # p 47
 N83-10623 # p 90
 N83-10624 # p 122
 N83-10625 # p 90
 N83-10626 # p 47
 N83-10627 # p 161
 N83-10628 # p 5
 N83-10629 # p 90
 N83-10631 # p 90
 N83-10632 # p 48
 N83-10633 # p 122
 N83-10634 # p 122
 N83-10635 # p 122
 N83-10636 # p 6
 N83-10637 # p 122
 N83-10638 # p 91
 N83-10639 # p 122
 N83-10640 # p 91
 N83-10641 # p 91
 N83-10642 # p 6
 N83-10643 # p 91
 N83-10651 # p 6
 N83-10652 # p 91
 N83-10654 # p 6
 N83-10656 # p 6
 N83-10661 # p 6
 N83-10663 # p 6
 N83-10665 # p 7
 N83-10705 # p 91
 N83-10718 # p 48
 N83-10719 # p 92
 N83-10756 # p 92
 N83-10879 # p 122
 N83-10880 # p 123
 N83-10897 # p 123
 N83-10902 # p 48
 N83-10908 # p 123
 N83-10910 # p 123
 N83-10917 # p 123
 N83-10919 # p 123
 N83-10920 # p 123
 N83-10921 # p 124
 N83-10922 # p 124
 N83-10925 # p 124
 N83-10926 # p 124
 N83-10928 # p 124
 N83-10930 # p 124
 N83-10931 # p 124

N83-10932 # p 124
 N83-10933 # p 125
 N83-10934 # p 125
 N83-10935 # p 125
 N83-10937 # p 125
 N83-10938 # p 125
 N83-10939 # p 125
 N83-10940 # p 125
 N83-10941 # p 126
 N83-10942 # p 126
 N83-10943 # p 126
 N83-10945 # p 126
 N83-10947 # p 126
 N83-10949 # p 126
 N83-10951 # p 126
 N83-10952 # p 127
 N83-10953 # p 127
 N83-10957 # p 127
 N83-10958 # p 127
 N83-10962* # p 48
 N83-10991* # p 127
 N83-11017 # p 161
 N83-11063* # p 127
 N83-11136 # p 7
 N83-11277 # p 7
 N83-11340* # p 92
 N83-11349 # p 92
 N83-11350 # p 92
 N83-11351 # p 92
 N83-11364 # p 92
 N83-11365 # p 93
 N83-11377 # p 93
 N83-11397 # p 127
 N83-11500 # p 93
 N83-11504 # p 128
 N83-11578 # p 161
 N83-11579 # p 128
 N83-11580* # p 161
 N83-11582 # p 162
 N83-11583 # p 93
 N83-11584 # p 162
 N83-11585 # p 48
 N83-11586 # p 48
 N83-11587 # p 93
 N83-11588 # p 48
 N83-11589 # p 49
 N83-11590 # p 128
 N83-11591 # p 7
 N83-11592 # p 7
 N83-11593 # p 7
 N83-11594 # p 8
 N83-11595 # p 94
 N83-11596 # p 94
 N83-11597 # p 8
 N83-11598 # p 49
 N83-11599 # p 162
 N83-11600 # p 94
 N83-11601 # p 128
 N83-11603 # p 128
 N83-11604 # p 8
 N83-11605 # p 49
 N83-11606 # p 8
 N83-11607 # p 128
 N83-11608 # p 49
 N83-11609 # p 8
 N83-11610 # p 162
 N83-11611 # p 8
 N83-11617 # p 9
 N83-11631 # p 9
 N83-11632 # p 9
 N83-11633 # p 9
 N83-11634 # p 9
 N83-11638 # p 94
 N83-11653 # p 94
 N83-11794 # p 170
 N83-11887 # p 9
 N83-12088* # p 128
 N83-12094* # p 9
 N83-12199 # p 94
 N83-12201 # p 95
 N83-12202 # p 95
 N83-12204 # p 95
 N83-12206 # p 76
 N83-12207 # p 95
 N83-12208 # p 95
 N83-12246* # p 95
 N83-12248* # p 96
 N83-12250* # p 96
 N83-12252 # p 96
 N83-12253 # p 96
 N83-12254 # p 96
 N83-12255 # p 96
 N83-12256 # p 97
 N83-12257 # p 97
 N83-12285 # p 10
 N83-12287 # p 49

N83-12327 # p 129
 N83-12344 # p 158
 N83-12386 # p 49
 N83-12387 # p 158
 N83-12390 # p 97
 N83-12431* # p 129
 N83-12437 # p 129
 N83-12439 # p 129
 N83-12440 # p 97
 N83-12480 # p 97
 N83-12520 # p 129
 N83-12521 # p 10
 N83-12522 # p 129
 N83-12524* # p 130
 N83-12525* # p 159
 N83-12526 # p 130
 N83-12527 # p 130
 N83-12528 # p 130
 N83-12529 # p 130
 N83-12530 # p 130
 N83-12531 # p 130
 N83-12532 # p 130
 N83-12534 # p 130
 N83-12535 # p 130
 N83-12536 # p 10
 N83-12537 # p 131
 N83-12538 # p 50
 N83-12539 # p 50
 N83-12540 # p 50
 N83-12541 # p 97
 N83-12542 # p 10
 N83-12543 # p 50
 N83-12544 # p 10
 N83-12545 # p 50
 N83-12547 # p 50
 N83-12548 # p 51
 N83-12549 # p 51
 N83-12550 # p 51
 N83-12552 # p 51
 N83-12553 # p 51
 N83-12554 # p 51
 N83-12555 # p 51
 N83-12556 # p 52
 N83-12557 # p 52
 N83-12558 # p 52
 N83-12559 # p 10
 N83-12560 # p 52
 N83-12561 # p 162
 N83-12562 # p 52
 N83-12563 # p 52
 N83-12564 # p 131
 N83-12565 # p 131
 N83-12566 # p 53
 N83-12567 # p 53
 N83-12568 # p 53
 N83-12569 # p 53
 N83-12570 # p 53
 N83-12571 # p 97
 N83-12572 # p 162
 N83-12573 # p 163
 N83-12574 # p 53
 N83-12575 # p 53
 N83-12576 # p 54
 N83-12577 # p 54
 N83-12580 # p 10
 N83-12581 # p 10
 N83-12582 # p 163
 N83-12583 # p 163
 N83-12584 # p 98
 N83-12585 # p 54
 N83-12586 # p 54
 N83-12587 # p 54
 N83-12588 # p 54
 N83-12589 # p 55
 N83-12590 # p 11
 N83-12591 # p 11
 N83-12592 # p 131
 N83-12593 # p 11
 N83-12594 # p 11
 N83-12630 # p 11
 N83-12659 # p 11
 N83-12665 # p 12
 N83-12666 # p 12
 N83-12667 # p 98
 N83-12668 # p 12
 N83-12672 # p 12
 N83-12704 # p 98
 N83-12706 # p 98
 N83-12736 # p 170
 N83-12737 # p 170
 N83-12751 # p 98
 N83-12754 # p 99
 N83-12785 # p 99
 N83-12788 # p 99
 N83-12995 # p 131
 N83-12996 # p 131

N83-12997 # p 131
 N83-12998* # p 131
 N83-13001 # p 132
 N83-13003 # p 132
 N83-13005 # p 99
 N83-13006 # p 132
 N83-13007 # p 132
 N83-13008 # p 132
 N83-13038* # p 132
 N83-13041 # p 99
 N83-13089 # p 99
 N83-13197 # p 100
 N83-13217 # p 12
 N83-13240 # p 100
 N83-13248 # p 159
 N83-13270 # p 12
 N83-13272* # p 100
 N83-13276 # p 76
 N83-13277 # p 100
 N83-13279 # p 100
 N83-13280 # p 101
 N83-13281 # p 101
 N83-13282 # p 101
 N83-13283 # p 101
 N83-13284 # p 101
 N83-13310 # p 159
 N83-13311 # p 159
 N83-13359* # p 133
 N83-13372 # p 133
 N83-13378 # p 101
 N83-13402 # p 12
 N83-13415 # p 163
 N83-13464 # p 101
 N83-13465 # p 13
 N83-13504 # p 55
 N83-13516 # p 13
 N83-13552 # p 102
 N83-13553 # p 102
 N83-13554 # p 102
 N83-13557 # p 102
 N83-13558 # p 102
 N83-13559 # p 102
 N83-13579* # p 55
 N83-13580 # p 55
 N83-13581* # p 55
 N83-13582* # p 55
 N83-13583* # p 55
 N83-13584 # p 13
 N83-13585* # p 56
 N83-13586* # p 56
 N83-13587* # p 13
 N83-13588* # p 102
 N83-13589* # p 133
 N83-13590 # p 163
 N83-13591 # p 163
 N83-13592 # p 163
 N83-13593 # p 76
 N83-13594 # p 13
 N83-13595 # p 13
 N83-13596 # p 56
 N83-13597 # p 56
 N83-13598 # p 13
 N83-13599 # p 56
 N83-13600 # p 56
 N83-13601 # p 102
 N83-13602 # p 102
 N83-13603 # p 57
 N83-13604 # p 57
 N83-13605 # p 103
 N83-13606 # p 14
 N83-13607 # p 164
 N83-13608 # p 133
 N83-13609 # p 164
 N83-13610 # p 164
 N83-13611 # p 164
 N83-13612 # p 164
 N83-13613 # p 14
 N83-13615 # p 14
 N83-13616 # p 57
 N83-13617 # p 14
 N83-13618 # p 164
 N83-13619 # p 14
 N83-13620 # p 14
 N83-13621 # p 15
 N83-13622 # p 57
 N83-13623 # p 57
 N83-13625 # p 133
 N83-13626 # p 57
 N83-13627 # p 165
 N83-13628 # p 15
 N83-13629 # p 103
 N83-13630 # p 15
 N83-13631 # p 103
 N83-13632 # p 58
 N83-13633 # p 133

N83-13634 # p 165
 N83-13635 # p 165
 N83-13636 # p 103
 N83-13637 # p 165
 N83-13644* # p 15
 N83-13647 # p 15
 N83-13649 # p 15
 N83-13650 # p 103
 N83-13651 # p 16
 N83-13652 # p 16
 N83-13657 # p 16
 N83-13658 # p 16
 N83-13659 # p 16
 N83-13664 # p 16
 N83-13665 # p 16
 N83-13666 # p 17
 N83-13669 # p 17
 N83-13670 # p 17
 N83-13672 # p 58
 N83-13673 # p 103
 N83-13694 # p 103
 N83-13695 # p 104
 N83-13714 # p 133
 N83-13972 # p 17
 N83-13973 # p 17
 N83-13974 # p 134
 N83-13975 # p 104
 N83-13976 # p 17
 N83-13977 # p 17
 N83-13989 # p 134
 N83-13990 # p 134
 N83-13993 # p 134
 N83-13994 # p 134
 N83-13996 # p 134
 N83-13997 # p 134
 N83-13998 # p 134
 N83-13999 # p 135
 N83-14000 # p 135
 N83-14016* # p 170
 N83-14074 # p 18
 N83-14116 # p 18
 N83-14151 # p 135
 N83-14156 # p 135
 N83-14165 # p 104
 N83-14178 # p 104
 N83-14179 # p 58
 N83-14189 # p 104
 N83-14192 # p 104
 N83-14197 # p 104
 N83-14198 # p 105
 N83-14202 # p 105
 N83-14204 # p 76
 N83-14205 # p 105
 N83-14206 # p 105
 N83-14207 # p 105
 N83-14208 # p 105
 N83-14291 # p 106
 N83-14293* # p 106
 N83-14294 # p 106
 N83-14299 # p 106
 N83-14300 # p 106
 N83-14301 # p 106
 N83-14302 # p 18
 N83-14303 # p 76
 N83-14306 # p 106
 N83-14312 # p 18
 N83-14414 # p 165
 N83-14454 # p 107
 N83-14495 # p 107
 N83-14545 # p 135
 N83-14575* # p 18
 N83-14607* # p 107
 N83-14628 # p 107
 N83-14658 # p 107
 N83-14661 # p 107
 N83-14662 # p 165
 N83-14664 # p 18
 N83-14665* # p 58
 N83-14666* # p 58
 N83-14667* # p 165
 N83-14668* # p 58
 N83-14669* # p 59
 N83-14670* # p 59
 N83-14671* # p 59
 N83-14673* # p 59
 N83-14674* # p 59
 N83-14675* # p 59
 N83-14676* # p 60
 N83-14677* # p 60
 N83-14678* # p 60
 N83-14679* # p 60
 N83-14680* # p 60
 N83-14681* # p 60
 N83-14682* # p 60
 N83-14683* # p 166
 N83-14684* # p 135

ACCESSION NUMBER INDEX

N83-16259

N83-14685* #	p 61	N83-15111 #	p 137	N83-15861* #	p 143	N83-16119 #	p 151
N83-14686* #	p 61	N83-15113 #	p 21	N83-15862 #	p 143	N83-16120 #	p 151
N83-14687* #	p 61	N83-15114 #	p 21	N83-15863 #	p 143	N83-16121 #	p 151
N83-14688* #	p 136	N83-15115 #	p 21	N83-15864* #	p 143	N83-16122 #	p 151
N83-14689* #	p 136	N83-15116 #	p 137	N83-15865* #	p 73	N83-16123 #	p 151
N83-14690* #	p 136	N83-15117 #	p 138	N83-15866* #	p 143	N83-16124 #	p 151
N83-14691* #	p 136	N83-15118 #	p 138	N83-15867* #	p 144	N83-16125 #	p 152
N83-14692* #	p 61	N83-15126 #	p 138	N83-15868* #	p 73	N83-16126 #	p 152
N83-14693* #	p 136	N83-15132 #	p 138	N83-15869 #	p 144	N83-16127 #	p 152
N83-14694 #	p 61	N83-15133 #	p 138	N83-15870 #	p 170	N83-16128 #	p 152
N83-14695* #	p 61	N83-15134 #	p 138	N83-15871 #	p 144	N83-16129 #	p 152
N83-14696 #	p 61	N83-15135 #	p 138	N83-15872 #	p 144	N83-16130 #	p 152
N83-14697 #	p 62	N83-15136 #	p 139	N83-15874 #	p 144	N83-16131 #	p 152
N83-14698 #	p 62	N83-15139 #	p 139	N83-15877 #	p 170	N83-16132 #	p 153
N83-14699* #	p 62	N83-15140 #	p 139	N83-15878 #	p 144	N83-16133 #	p 153
N83-14700 #	p 62	N83-15141 #	p 139	N83-15880* #	p 170	N83-16134 #	p 153
N83-14701 #	p 62	N83-15142 #	p 139	N83-15881* #	p 171	N83-16135 #	p 153
N83-14702 #	p 62	N83-15143 #	p 139	N83-15882* #	p 171	N83-16136 #	p 153
N83-14703 #	p 62	N83-15144 #	p 140	N83-15883 #	p 171	N83-16137 #	p 153
N83-14704 #	p 63	N83-15169* #	p 167	N83-15886 #	p 144	N83-16138 #	p 153
N83-14705* #	p 63	N83-15176* #	p 140	N83-15887 #	p 145	N83-16139 #	p 154
N83-14706 #	p 63	N83-15177* #	p 140	N83-15888 #	p 145	N83-16140 #	p 154
N83-14707 #	p 63	N83-15322 #	p 109	N83-15889 #	p 145	N83-16143 #	p 154
N83-14708* #	p 63	N83-15372* #	p 167	N83-15892 #	p 159	N83-16153* #	p 77
N83-14709 #	p 63	N83-15395 #	p 109	N83-15893 #	p 145	N83-16195 #	p 22
N83-14710 #	p 63	N83-15401 #	p 21	N83-15894 #	p 159	N83-16211 #	p 154
N83-14711 #	p 64	N83-15402 #	p 109	N83-15895 #	p 145	N83-16212 #	p 112
N83-14712 #	p 64	N83-15427 #	p 109	N83-15898 #	p 145	N83-16214 #	p 154
N83-14713* #	p 64	N83-15489 #	p 109	N83-15899 #	p 73	N83-16217 #	p 154
N83-14714 #	p 64	N83-15495 #	p 109	N83-15900 #	p 146	N83-16218 #	p 154
N83-14715 #	p 64	N83-15496 #	p 110	N83-15901 #	p 146	N83-16220 #	p 155
N83-14716 #	p 64	N83-15497 #	p 110	N83-15902 #	p 73	N83-16222 #	p 155
N83-14717 #	p 64	N83-15498 #	p 110	N83-15903 #	p 146	N83-16226 #	p 155
N83-14718 #	p 65	N83-15499 #	p 110	N83-15904 #	p 73	N83-16227 #	p 155
N83-14719 #	p 65	N83-15587 #	p 167	N83-15905 #	p 73	N83-16228 #	p 155
N83-14720 #	p 65	N83-15628* #	p 110	N83-15906 #	p 74	N83-16229 #	p 155
N83-14721 #	p 65	N83-15659 #	p 21	N83-15907 #	p 146	N83-16230 #	p 155
N83-14722* #	p 65	N83-15712 #	p 110	N83-15908 #	p 146	N83-16231 #	p 155
N83-14723 #	p 65	N83-15732 #	p 110	N83-15909 #	p 146	N83-16232 #	p 156
N83-14724 #	p 65	N83-15801 #	p 111	N83-15910 #	p 111	N83-16233 #	p 156
N83-14725 #	p 65	N83-15802 #	p 111	N83-15911* #	p 146	N83-16256 #	p 22
N83-14726 #	p 66	N83-15803 #	p 111	N83-15912 #	p 146	N83-16257* #	p 169
N83-14727 #	p 66	N83-15805* #	p 111	N83-15913 #	p 147	N83-16259 #	p 156
N83-14728 #	p 66	N83-15807* #	p 68	N83-15914 #	p 147		
N83-14729 #	p 66	N83-15808* #	p 68	N83-15915 #	p 21		
N83-14730 #	p 66	N83-15809* #	p 68	N83-15916* #	p 147		
N83-14731 #	p 66	N83-15810* #	p 68	N83-15917 #	p 147		
N83-14732* #	p 66	N83-15811* #	p 69	N83-15918 #	p 147		
N83-14733 #	p 66	N83-15812* #	p 69	N83-15919 #	p 147		
N83-14734 #	p 18	N83-15813* #	p 69	N83-15920 #	p 147		
N83-14735 #	p 67	N83-15814* #	p 69	N83-15921 #	p 148		
N83-14736 #	p 67	N83-15815* #	p 69	N83-15922 #	p 74		
N83-14737 #	p 67	N83-15816* #	p 69	N83-15923 #	p 111		
N83-14738 #	p 67	N83-15817* #	p 69	N83-15924 #	p 74		
N83-14739 #	p 19	N83-15818* #	p 69	N83-15925 #	p 148		
N83-14740 #	p 136	N83-15819* #	p 70	N83-15926 #	p 148		
N83-14741 #	p 67	N83-15820* #	p 70	N83-15927 #	p 148		
N83-14742 #	p 166	N83-15821* #	p 70	N83-15928 #	p 148		
N83-14743 #	p 166	N83-15822* #	p 70	N83-15929 #	p 148		
N83-14745 #	p 19	N83-15823* #	p 70	N83-15930 #	p 148		
N83-14746 #	p 137	N83-15824* #	p 70	N83-15931 #	p 148		
N83-14747 #	p 137	N83-15825* #	p 71	N83-15932 #	p 148		
N83-14748 #	p 166	N83-15826* #	p 71	N83-15933 #	p 149		
N83-14749 #	p 166	N83-15827* #	p 71	N83-15934 #	p 149		
N83-14750 #	p 107	N83-15828* #	p 71	N83-15935 #	p 149		
N83-14751 #	p 67	N83-15829* #	p 71	N83-15936 #	p 149		
N83-14752 #	p 108	N83-15830* #	p 71	N83-15937 #	p 149		
N83-14753 #	p 19	N83-15831* #	p 72	N83-15938 #	p 149		
N83-14754 #	p 166	N83-15832* #	p 72	N83-15939 #	p 150		
N83-14755 #	p 167	N83-15833* #	p 72	N83-15940 #	p 150		
N83-14756 #	p 137	N83-15834* #	p 72	N83-15941 #	p 150		
N83-14757 #	p 19	N83-15835* #	p 72	N83-15942 #	p 74		
N83-14758 #	p 167	N83-15836* #	p 72	N83-15943 #	p 168		
N83-14759 #	p 167	N83-15837* #	p 72	N83-15944 #	p 168		
N83-14760 #	p 137	N83-15838* #	p 72	N83-15945 #	p 168		
N83-14761 #	p 67	N83-15839* #	p 140	N83-15946 #	p 168		
N83-14762 #	p 68	N83-15840* #	p 73	N83-15947 #	p 168		
N83-14763 #	p 68	N83-15841 #	p 140	N83-15948 #	p 168		
N83-14764 #	p 68	N83-15842 #	p 140	N83-15949 #	p 168		
N83-14765 #	p 19	N83-15844 #	p 140	N83-15950 #	p 168		
N83-14767 #	p 19	N83-15845 #	p 167	N83-15951 #	p 111		
N83-14770 #	p 19	N83-15846 #	p 140	N83-15952 #	p 112		
N83-14772 #	p 19	N83-15847* #	p 141	N83-15953 #	p 74		
N83-14774 #	p 20	N83-15848 #	p 141	N83-15954 #	p 150		
N83-14775 #	p 108	N83-15849 #	p 141	N83-15955 #	p 21		
N83-14776 #	p 20	N83-15850 #	p 141	N83-15956 #	p 169		
N83-14778 #	p 20	N83-15851 #	p 141	N83-15957 #	p 169		
N83-14781 #	p 20	N83-15852 #	p 141	N83-15958 #	p 77		
N83-14783 #	p 20	N83-15853 #	p 142	N83-15959 #	p 112		
N83-14795 #	p 108	N83-15854 #	p 142	N83-15960 #	p 22		
N83-14808 #	p 68	N83-15855 #	p 142	N83-15965 #	p 112		
N83-14816 #	p 108	N83-15856 #	p 142	N83-16114 #	p 150		
N83-14877 #	p 108	N83-15857 #	p 142	N83-16115 #	p 150		
N83-14968 #	p 20	N83-15858 #	p 142	N83-16116 #	p 150		
N83-15104 #	p 137	N83-15859 #	p 143	N83-16117 #	p 150		
N83-15110 #	p 137	N83-15860 #	p 143	N83-16118 #	p 151		

PUBLIC COLLECTIONS OF NASA DOCUMENTS

DOMESTIC

NASA distributes its technical documents and bibliographic tools to eleven special libraries located in the organizations listed below. Each library is prepared to furnish the public such services as reference assistance, interlibrary loans, photocopy service, and assistance in obtaining copies of NASA documents for retention.

CALIFORNIA

University of California, Berkeley

COLORADO

University of Colorado, Boulder

DISTRICT OF COLUMBIA

Library of Congress

GEORGIA

Georgia Institute of Technology, Atlanta

ILLINOIS

The John Crerar Library, Chicago

MASSACHUSETTS

Massachusetts Institute of Technology, Cambridge

MISSOURI

Linda Hall Library, Kansas City

NEW YORK

Columbia University, New York

OKLAHOMA

University of Oklahoma, Bizzell Library

PENNSYLVANIA

Carnegie Library of Pittsburgh

WASHINGTON

University of Washington, Seattle

NASA publications (those indicated by an '*' following the accession number) are also received by the following public and free libraries.

CALIFORNIA

Los Angeles Public Library

San Diego Public Library

COLORADO

Denver Public Library

CONNECTICUT

Hartford Public Library

MARYLAND

Enoch Pratt Free Library, Baltimore

MASSACHUSETTS

Boston Public Library

MICHIGAN

Detroit Public Library

MINNESOTA

Minneapolis Public Library and Information Center

NEW JERSEY

Trenton Public Library

NEW YORK

Brooklyn Public Library

Buffalo and Erie County Public Library

Rochester Public Library

New York Public Library

OHIO

Akron Public Library

Cincinnati and Hamilton County Public Library

Cleveland Public Library

Dayton Public Library

Toledo and Lucas County Public Library

TEXAS

Dallas Public Library

Fort Worth Public Library

WASHINGTON

Seattle Public Library

WISCONSIN

Milwaukee Public Library

An extensive collection of NASA and NASA-sponsored documents and aerospace publications available to the public for reference purposes is maintained by the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

EUROPEAN

An extensive collection of NASA and NASA-sponsored publications is maintained by the British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. By virtue of arrangements other than with NASA, the British Library Lending Division also has available many of the non-NASA publications cited in *STAR*. European requesters may purchase facsimile copy of microfiche of NASA and NASA-sponsored documents, those identified by both the symbols '#' and '*' from: ESA - Information Retrieval Service, European Space Agency, 8-10 rue Mario-Nikis, 75738 Paris CEDEX 15, France.

National Aeronautics and
Space Administration

Washington, D.C.
20546

Official Business

Penalty for Private Use, \$300

SPECIAL FOURTH CLASS MAIL
BOOK

Postage and Fees Paid
National Aeronautics and
Space Administration
NASA-451



6 1 SP-7043, 830602 S90569AU 850609
NASA
SCIEN & TECH INFO FACILITY
ATTN: ACCESSIONING DEPT
P O BOX 3757 BWI ARPRT
BALTIMORE MD 21240

NASA

POSTMASTER If Undeliverable (Section 158
Postal Manual) Do Not Return